

Rahul Jandial
Michelle R. Aizenberg
Mike Y. Chen

100

Case Reviews in Neurosurgery

Aryan	Harsh	Larson
Benjamin	Kanter	Levy
Brown	Kazmi	Prakash
Ciacci	Khalessi	Waters

ELSEVIER

Any screen. Any time. Anywhere.

Activate the eBook version
of this title at no additional charge.



Expert Consult eBooks give you the power to browse and find content, view enhanced images, share notes and highlights—both online and offline.

Unlock your eBook today.

- 1 Visit expertconsult.inkling.com/redeem
- 2 Scratch off your code
- 3 Type code into “Enter Code” box
- 4 Click “Redeem”
- 5 Log in or Sign up
- 6 Go to “My Library”

It's that easy!

Scan this QR code to redeem your eBook through your mobile device:



Place Peel Off
Sticker Here

For technical assistance:
email expertconsult.help@elsevier.com
call 1-800-401-9962 (inside the US)
call +1-314-447-8200 (outside the US)

ELSEVIER

*100 Case Reviews
in Neurosurgery*

This page intentionally left blank

100 Case Reviews in Neurosurgery

RAHUL JANDIAL, MD, PhD

Associate Professor
Division of Neurosurgery, Department of Surgery
City of Hope Cancer Center & Beckman Research Institute
Los Angeles, CA, USA

MICHELE R. AIZENBERG, MD

Associate Professor of Neurological Surgery and Oncology,
Director, Brain and Spine Cancer Center
University of Nebraska Medical Center
Omaha, NE, USA

MIKE Y. CHEN, MD, PhD

Associate Professor
Division of Neurosurgery, Department of Surgery
City of Hope Cancer Center & Beckman Research Institute
Los Angeles, CA, USA

SECTION EDITORS

Henry E. Aryan, MD
Ramsis Benjamin, MD
Justin Brown, MD
Joseph D. Ciacci, MD
Griffith R. Harsh IV, MD
Adam S. Kanter, MD
Aasim S. Kazmi, MD
Alexander A. Khalessi, MD
Paul S. Larson, MD
Michael L. Levy, MD, PhD
Neal Prakash, MD, PhD
J. Dawn Waters, MD

For additional online content visit <http://expertconsult.inkling.com>

ELSEVIER

Edinburgh London New York Oxford Philadelphia St Louis Sydney Toronto 2017

ELSEVIER

© 2017, Elsevier Inc. All rights reserved.

No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or any information storage and retrieval system, without permission in writing from the publisher. Details on how to seek permission, further information about the Publisher's permissions policies and our arrangements with organizations such as the Copyright Clearance Center and the Copyright Licensing Agency, can be found at our website: www.elsevier.com/permissions

This book and the individual contributions contained in it are protected under copyright by the Publisher (other than as may be noted herein).

Notices

Knowledge and best practice in this field are constantly changing. As new research and experience broaden our understanding, changes in research methods, professional practices, or medical treatment may become necessary.

Practitioners and researchers must always rely on their own experience and knowledge in evaluating and using any information, methods, compounds, or experiments described herein. In using such information or methods they should be mindful of their own safety and the safety of others, including parties for whom they have a professional responsibility.

With respect to any drug or pharmaceutical products identified, readers are advised to check the most current information provided (i) on procedures featured or (ii) by the manufacturer of each product to be administered, to verify the recommended dose or formula, the method and duration of administration, and contraindications. It is the responsibility of practitioners, relying on their own experience and knowledge of their patients, to make diagnoses, to determine dosages and the best treatment for each individual patient, and to take all appropriate safety precautions.

To the fullest extent of the law, neither the Publisher nor the authors, contributors, or editors, assume any liability for any injury and/or damage to persons or property as a matter of products liability, negligence or otherwise, or from any use or operation of any methods, products, instructions, or ideas contained in the material herein.

ISBN: 978-0-323-35637-4

Content Strategist: Charlotta Kryhl
Content Development Specialist: Alexandra Mortimer
Content Coordinator: Devika Ponnambalam
Project Manager: Louisa Talbott
Design: Christian Bilbow
Illustration Manager: Amy Naylor
Marketing Manager: Rachael Pignotti

Printed in China

Last digit is the print number: 9 8 7 6 5 4 3 2 1



Working together
to grow libraries in
developing countries

www.elsevier.com • www.bookaid.org

Contents

Preface xii
List of Contributors xiii
Acknowledgments xxii
Dedication xxiii

SECTION I

Vascular Neurosurgery

Section Editor: Alexander A. Khalessi, MD

- 1 Cerebral Arteriovenous Malformation 1**
Jason W. Signorelli • J. Scott Pannell, MD •
Alexander A. Khalessi, MD
- 2 Cavernous Malformation 9**
Jeffrey A. Steinberg, MD • J. Scott Pannell, MD •
Alexander A. Khalessi, MD
- 3 Ruptured Middle Cerebral Artery Aneurysm 15**
Vincent J. Cheung, MD • Jayson A. Sack, MD •
J. Scott Pannell, MD • Alexander A. Khalessi, MD
- 4 Unruptured Anterior Communicating Artery Aneurysm 21**
Vincent J. Cheung, MD • Jayson A. Sack, MD •
J. Scott Pannell, MD • Alexander A. Khalessi, MD
- 5 Intradural Internal Carotid Artery Fusiform Aneurysm 25**
Gunjan Goel, MD • J. Scott Pannell, MD •
Alexander A. Khalessi, MD
- 6 Spinal Arteriovenous Malformations 31**
J. Scott Pannell, MD • Alexander A. Khalessi, MD
- 7 Cranial Dural Arteriovenous Fistula 37**
Reid Hoside, MD • J. Scott Pannell, MD •
Alexander A. Khalessi, MD
- 8 Spinal Dural Arteriovenous Fistulas 43**
David R. Santiago-Dieppa, MD • J. Scott Pannell, MD •
Scott E. Olson, MD • Alexander A. Khalessi, MD
- 9 Vertebral Artery Dissection 47**
Robert C. Rennert, MD • Jayson A. Sack, MD •
J. Scott Pannell, MD • Alexander A. Khalessi, MD
- 10 Basilar Tip Aneurysm 53**
Robert C. Rennert, MD • Jayson A. Sack, MD •
J. Scott Pannell, MD • Alexander A. Khalessi, MD
- 11 Endovascular Treatment of Unruptured Aneurysms 61**
J. Scott Pannell, MD • Alexander A. Khalessi, MD

- 12** Dominant Hemisphere Hemorrhagic Stroke 69
J. Scott Pannell, MD • Robert C. Rennert, MD •
Scott E. Olson, MD • Alexander A. Khalessi, MD
- 13** Hypertensive Thalamic Hemorrhage 73
Jason W. Signorelli • J. Scott Pannell, MD •
Alexander A. Khalessi, MD
- 14** Cerebellar Hemorrhage 81
Reid Hoside, MD • J. Scott Pannell, MD •
Alexander A. Khalessi, MD
- 15** Moyamoya Disease 85
Brandon C. Gabel, MD • J. Scott Pannell, MD •
Alexander A. Khalessi, MD
- 16** Venous Sinus Thrombosis 89
Brandon C. Gabel, MD • J. Scott Pannell, MD •
Alexander A. Khalessi, MD
- 17** Carotid Stenosis 93
Jeffrey A. Steinberg, MD • J. Scott Pannell, MD •
Alexander A. Khalessi, MD
- 18** Ischemic Stroke Management 101
Joel R. Martin, MD • J. Scott Pannell, MD •
Scott E. Olson, MD • Alexander A. Khalessi, MD

SECTION II

Nontraumatic Cranial Lesions

Section Editor: Griffith R. Harsh IV, MD • J. Dawn Waters, MD

- 19** Vestibular Schwannoma 109
Robert M. Lober, MD, PhD • Abdulrazag Ajlan, MD
- 20** Sphenoid Wing Meningioma 115
Omar Choudhri, MD
- 21** Cerebellar Cystic Hemangioblastoma 121
J. Dawn Waters, MD • Griffith R. Harsh IV, MD
- 22** Pituitary Apoplexy 127
James Wright, MD • Christina Huang Wright, MD
- 23** Cushing's Microadenoma 131
J. Dawn Waters, MD
- 24** Pituitary Macroadenoma – Prolactinoma 137
Melanie G. Hayden Gephart, MD • YouRong Sophie Su
- 25** Craniopharyngioma 141
Matthew G. MacDougall, MD • David D. Gonda, MD •
Michael L. Levy, MD, PhD
- 26** Glioblastoma 147
Kevin K.H. Chow, MD, PhD
- 27** Anaplastic Oligodendroglioma 151
Christine K. Lee, MD, PhD •
Melanie G. Hayden Gephart, MD
- 28** Low-Grade Glioma 155
Christina Huang Wright, MD • James Wright, MD

- 29** Radiation Necrosis versus Tumor Recurrence 159
Derek Yecies, MD • J. Dawn Waters, MD
- 30** CNS Lymphoma 163
Zachary Medress • Kai Miller, MD • Li Gordon, MD
- 31** Brain Metastases 167
Kevin K.H. Chow, MD, PhD
- 32** Intraventricular Colloid Cyst 171
Arjun V. Pendharkar, MD • Melanie G. Hayden Gephart, MD
- 33** Cerebral Abscess 175
Aatman Shah • Henry Jung, MD
- 34** Chiari I Malformation 179
Henry Jung, MD • Aatman Shah
- 35** Ependymoma 183
Zachary Medress • Melanie G. Hayden Gephart, MD
- 36** Normal Pressure Hydrocephalus 187
Robert C. Rennert, MD • Vincent J. Cheung, MD •
J. Dawn Waters, MD
- 37** Arachnoid Cyst 191
J. Dawn Waters, MD

SECTION III

Neurosurgical Trauma

Section Editor: Joseph D. Ciacci, MD

- 38** Penetrating Head Injuries 195
Vincent J. Cheung, MD • Brandon C. Gabel, MD •
Joseph D. Ciacci, MD
- 39** Intractable Intracranial Hypertension 201
Vincent J. Cheung, MD • David R. Santiago-Dieppa, MD •
Brandon C. Gabel, MD • Joseph D. Ciacci, MD
- 40** Epidural Hematoma 205
Vincent J. Cheung, MD • Brandon C. Gabel, MD •
Joseph D. Ciacci, MD
- 41** Chronic Subdural Hematoma 209
Erik I. Curtis, MD • Brandon C. Gabel, MD •
Joseph D. Ciacci, MD
- 42** Subaxial Cervical Fracture 213
Erik I. Curtis, MD • Brandon C. Gabel, MD •
Nicholas Fain • Joseph D. Ciacci, MD
- 43** Odontoid Fractures 219
Brandon C. Gabel, MD • Erik I. Curtis, MD •
Joseph D. Ciacci, MD
- 44** Hangman's Fracture 225
Brandon C. Gabel, MD • Vincent J. Cheung, MD •
Joseph D. Ciacci, MD
- 45** Thoracolumbar Burst Fractures 231
Brandon C. Gabel, MD • Erik I. Curtis, MD •
Joseph D. Ciacci, MD

- 46** Chance Fractures 237
Brandon C. Gabel, MD • Joseph D. Ciacci, MD
- 47** Jumped Cervical Facets 241
Brandon C. Gabel, MD • Joseph D. Ciacci, MD

SECTION IV

Spinal Neurosurgery

Section Editor: Adam S. Kanter, MD

- 48** Atlanto-Axial Dislocation 247
Gurpreet S. Gandhoke, MD • Adam S. Kanter, MD
- 49** Basilar Invagination - Rheumatoid Pannus 253
Zachary J. Tempel, MD • Robert A. Miller, MD •
Adam S. Kanter, MD
- 50** Cervical Spondylotic Myelopathy 261
Christian B. Ricks, MD • Nathan T. Zwagerman, MD •
Adam S. Kanter, MD
- 51** Cauda Equina Syndrome 265
Gurpreet S. Gandhoke, MD • Adam S. Kanter, MD
- 52** Foot Drop and Far Lateral Disc Herniation 269
Christian B. Ricks, MD • Adam S. Kanter, MD
- 53** Thoracic Disc Herniation 273
Zachary J. Tempel, MD • Adam S. Kanter, MD
- 54** Spinal Epidural Abscess 279
Christian B. Ricks, MD • Adam S. Kanter, MD
- 55** Spinal Metastases 283
Todd Harshbarger, MD • Mike Y. Chen, MD, PhD
- 56** Spinal Intradural Extramedullary Mass 289
Hazem Mashaly, MD • Zachary J. Tempel, MD •
Adam S. Kanter, MD
- 57** Intradural Intramedullary Mass 293
Hazem Mashaly, MD • Zachary J. Tempel, MD • Adam S. Kanter MD
- 58** Cervical Ossified Posterior Longitudinal Ligament 299
Hazem Mashaly, MD • Adam S. Kanter, MD
- 59** Ankylosing Spondylitis 307
Michael M. McDowell, MD • Zachary J. Tempel, MD •
Adam S. Kanter
- 60** Chordoma 313
Michael M. McDowell, MD • Zachary J. Tempel, MD •
Adam S. Kanter, MD

SECTION V

Pediatric Neurosurgery

Section Editor: Michael L. Levy, MD, PhD

- 61** Pineal Tumor 319
Bond Nguyen • Melanie G. Hayden Gephart, MD •
Alexa Smith, MD • Michael L. Levy, MD, PhD

- 62** Myelomeningocele 327
Alexa Smith, MD • Bond Nguyen •
Michael L. Levy, MD, PhD
- 63** Cerebellar Medulloblastoma 331
Michael L. Levy, MD, PhD • John R. Crawford, MD, PhD •
Alexa Smith, MD
- 64** Brainstem Glioma 337
Michael L. Levy, MD, PhD • John R. Crawford, MD, PhD •
Alexa Smith, MD • Salman Abbasifard, MD
- 65** Hypothalamic Hamartoma 341
Michael L. Levy, MD, PhD • John R. Crawford, MD, PhD •
Alexa Smith, MD • Salman Abbasifard, MD
- 66** Endoscopic Third Ventriculostomy 345
Michael L. Levy, MD, PhD • John R. Crawford, MD, PhD •
Alexa Smith, MD • Salman Abbasifard, MD •
Ali H. A. Muhammad Altameemi, MD
- 67** Slit Ventricle Syndrome 353
Michael L. Levy, MD, PhD • John R. Crawford, MD, PhD •
David S. Hong, MD • Alexa Smith, MD
- 68** Neural Tube Defect-Tethered Cord Syndrome 357
Hal S. Meltzer, MD • Michael L. Levy, MD, PhD •
Alexa Smith, MD • Salman Abbasifard, MD
- 69** Craniosynostosis – Plagiocephaly 361
Hal S. Meltzer, MD • Michael L. Levy, MD, PhD •
Alexa Smith, MD • Dillon Levy • Salman Abbasifard, MD
- 70** Vein of Galen Malformations 367
Brandon C. Gabel MD • Jeffrey A. Steinberg, MD •
Michael L. Levy, MD, PhD
- 71** Pilocytic Astrocytoma 371
Michael L. Levy, MD, PhD • John R. Crawford, MD, PhD •
Alexa Smith, MD • Ali H. A. Muhammad Altameemi, MD

SECTION VI

Stereotactic and Functional Neurosurgery

Section Editor: Paul S. Larson, MD

- 72** Trigeminal Neuralgia 377
Andrew L. Ko, MD • Kim J. Burchiel, MD
- 73** Hemifacial Spasm 381
Thomas J. Gianaris, MD • Aaron Cohen-Gadol, MD •
Nicholas Barbaro, MD
- 74** Parkinson's Disease 385
Doris D. Wang, MD, PhD • Philip A. Starr, MD, PhD
- 75** Progressive Spastic Paraparesis and Decreased Mobility in a Young Patient 391
Tsinsue Chen, MD • Andrew Shetter, MD • Peter Nakaji, MD
- 76** Mesial Temporal Sclerosis 397
Nathan C. Rowland, MD, PhD • Edward F. Chang, MD

- 77** Corpus Callosotomy 403
Thomas L. Beaumont, MD, PhD • Matthew D. Smyth, MD
- 78** Normal Pressure Hydrocephalus 411
Michael Bohl, MD • David S. Xu, MD • Peter Nakaji, MD
- 79** Idiopathic Intracranial Hypertension (Pseudotumor Cerebri) 415
Benjamin D. Elder, MD, PhD • C. Rory Goodwin, MD, PhD •
Thomas A. Kosztowski, MD • Daniele Rigamonti, MD
- 80** Intractable Oncologic Pain 423
Nelson Moussazadeh, MD • Michael G. Kaplitt, MD, PhD
- 81** Spinal Cord Stimulation 429
Daniel M. Birk, MD • Konstantin V. Slavin, MD

SECTION VII

Peripheral Nerve Neurosurgery

Section Editor: Justin Brown, MD

- 82** Thoracic Outlet Syndrome 435
Justin Brown, MD • Mark A. Mahan, MD
- 83** Peroneal Neuropathy 439
Mark A. Mahan, MD • Justin Brown, MD
- 84** Nerve Sheath Tumor 443
Justin Brown, MD • Mark A. Mahan, MD
- 85** Cubital Tunnel Syndrome 447
Justin Brown, MD • Mark A. Mahan, MD
- 86** Carpal Tunnel Syndrome 453
Justin Brown, MD • Mark A. Mahan, MD
- 87** Brachial Plexus Injury 459
Justin Brown, MD • Mark A. Mahan, MD
- 88** Parsonage-Turner Syndrome 467
Justin Brown, MD • Mark A. Mahan, MD
- 89** Radial Nerve Injury 471
Justin Brown, MD • Geehan D'Souza, MD •
Mark A. Mahan, MD
- 90** Ulnar Nerve Injury 477
Justin Brown, MD • Mark A. Mahan, MD
- 91** Median Nerve Injury 481
Mark A. Mahan, MD • Justin Brown, MD

SECTION VIII

Neurology

Section Editors: Neal Prakash, MD, PhD • Ramsis Benjamin, MD

- 92** Multiple Sclerosis 489
Audrey Kohar, DO • Neal Prakash, MD, PhD
- 93** Amyotrophic Lateral Sclerosis 495
Ramsis Benjamin, MD

- 94** Guillain-Barré Syndrome 501
Ramsis Benjamin, MD
- 95** Devic's Syndrome 507
Audrey Kohar, DO • Noriko Salamon, MD •
Neal Prakash, MD, PhD
- 96** Human Immunodeficiency Virus 511
Ramsis Benjamin, MD
- 97** Status Epilepticus 517
Neal Prakash, MD, PhD
- 98** Neurosarcoidosis 521
Ramsis Benjamin, MD
- 99** Transverse Myelitis 525
Audrey Kohar, DO • Neal Prakash, MD, PhD
- 100** Giant Cell Arteritis 529
Ramsis Benjamin, MD

Glossary 533

APPENDICES

Section Editors: Henry E. Aryan, MD • Aasim S. Kazmi, MD

- Appendix A** Neuropathology 541
- Appendix B** Neurology 549
- Appendix C** Neuroradiology 557
- Appendix D** Spinal Fracture Grading 563
- Appendix E** Peripheral Nerve Exam 571
- Appendix F** Neurocutaneous Disorders 573
- Appendix G** Positioning 575

Index 579

Preface

As the most challenging discipline, Neurosurgery rebuffs any single text's attempt at revealing its intricacies and complexities. Accordingly, this text and its individual chapters aim for a more humble goal. Together, they aspire to serve as a primer of essential material often reviewed during certification examinations and a framework into which deeper knowledge can be contextualized.

From the perspective of didactic utility, the standard, time-tested neurosurgical textbooks offer a distillation of the most useful art and schemata. Therefore, figures from these familiar texts have been incorporated into this book, along with new art and imaging, in the hope that the aggregate will constitute a robust visual fabric within *100 Case Reviews in Neurosurgery*.

The book is divided into intuitive sections. The information provided and the questions posed follow the experience of a neurosurgeon being consulted in the hospital or seeing a new patient in clinic that has come to them for care. The vascular section covers surgical and nonsurgical elements that are key elements of essential vascular cases. The peripheral nerve section is particularly detailed since this is a specialized field most general neurosurgeons have limited exposure to in daily practice. The appendices provide information that is vital yet cumbersome to include in the flow of the chapters. The layout and presentation of information follows the formats of common grand rounds and examinations most readers have experienced from the beginning of their neurosurgical training through their current continuing education.

The most challenging part of constructing the book you now read has been to find that elusive balance invaluable to the modern pedagogical text between comprehensiveness and concision, between textual explanation and visual illustration, between esoteric specificity and simple intelligibility. My hope is that the content presented here has been insightfully and incisively curated for your purposes.

Rahul Jandial

List of Contributors

Salman Abbasifard, MD

International Pediatric Neurosurgery
Fellow
Rady Children's Hospital
University of California – San Diego
San Diego, CA, USA

- Case 64: Brainstem Glioma
- Case 65: Hypothalamic Hamartoma
- Case 66: Endoscopic Third Ventriculostomy
- Case 68: Neural Tube Defect–Tethered Cord Syndrome
- Case 69: Craniosynostosis – Plagiocephaly

Michele R. Aizenberg, MD

Associate Professor of Neurological Surgery and Oncology
Director, Brain and Spine Cancer Center
University of Nebraska Medical Center
Omaha, NE, USA

Abdulrazag Ajlan, MD

Clinical Instructor
Department of Neurosurgery
Stanford Hospitals and Clinics
Stanford, CA, USA

- Case 19: Vestibular Schwannoma

Ali H. A. Muhammad Altameemi, MD

International Fellow of Neurosurgery
Rady Children's Hospital San Diego
Division of Pediatric Neurosurgery
University of California – San Diego
San Diego, CA, USA

- Case 66: Endoscopic Third Ventriculostomy
- Case 71: Pilocytic Astrocytoma

Henry E. Aryan, MD

Clinical Professor of Neurosurgery, UC
San Francisco
Chief, Spine Center
Sierra Pacific Orthopedic & Spine Center
Fresno, CA, USA

- Section Editor for Appendices

Nicholas Barbaro, MD

Chairman
Department of Neurosurgery
Indiana University School of Medicine
Indianapolis, IN, USA

- Case 73: Hemifacial Spasm

Thomas L. Beaumont, MD, PhD

Senior Resident
Department of Neurological Surgery
Washington University School of Medicine
St. Louis, MO, USA

- Case 77: Corpus Callosotomy

Ramsis Benjamin, MD

City of Hope National Medical Center
Duarte, CA, USA

- Section Editor for Section 8 Neurology
- Case 93: Amyotrophic Lateral Sclerosis
- Case 94: Guillain-Barré Syndrome
- Case 96: Human Immunodeficiency Virus
- Case 98: Neurosarcoidosis
- Case 100: Giant Cell Arteritis

Daniel M. Birk, MD

Resident
Department of Neurosurgery
University of Illinois at Chicago
Chicago, IL, USA

- Case 81: Spinal Cord Stimulation

Michael Bohl, MD

Resident Physician
Division of Neurological Surgery
Barrow Neurological Institute
St. Joseph's Hospital and Medical Center
Phoenix, AZ, USA

- Case 78: Normal Pressure Hydrocephalus

Justin Brown, MD

Associate Professor
Department of Neurosurgery
University of California
San Diego School of Medicine
San Diego, CA, USA

Section Editor for Section 7
Peripheral Nerve Neurosurgery
Case 82: Thoracic Outlet Syndrome
Case 83: Peroneal Neuropathy
Case 84: Nerve Sheath Tumor
Case 85: Cubital Tunnel Syndrome
Case 86: Carpal Tunnel Syndrome
Case 87: Brachial Plexus Injury
Case 88: Parsonage-Turner Syndrome
Case 89: Radial Nerve Injury
Case 90: Ulnar Nerve Injury
Case 91: Median Nerve Injury

Kim J. Burchiel, MD

John Raaf Professor and Chairman
Department of Neurological Surgery
Oregon Health and Science University
Portland, OR, USA

Case 72: Trigeminal Neuralgia

Edward F. Chang, MD

Associate Professor
Department of Neurological Surgery
University of California – San Francisco
San Francisco, CA, USA

Case 76: Mesial Temporal Sclerosis

Mike Y. Chen, MD, PhD

Associate Professor
Division of Neurosurgery, Department of
Surgery
City of Hope Cancer Center & Beckman
Research Institute
Los Angeles, CA, USA

Case 55: Spinal Metastases

Tsinsue Chen, MD

Neurosurgery Resident
Division of Neurological Surgery
Barrow Neurological Institute
St. Joseph's Hospital and Medical Center
Phoenix, AZ, USA

Case 75: Progressive Spastic
Paraparesis and Decreased Mobility in
a Young Patient

Vincent J. Cheung, MD

Neurosurgical Resident
Division of Neurosurgery
University of California – San Diego
San Diego, CA, USA

Case 3: Ruptured Middle Cerebral
Artery Aneurysm

Case 4: Unruptured Anterior
Communicating Artery Aneurysm

Case 36: Normal Pressure

Hydrocephalus

Case 38: Penetrating Head Injury

Case 39: Intractable Intracranial
Hypertension

Case 40: Epidural Hematoma

Case 44: Hangman's Fracture

Omar Choudhri, MD

Neurosurgery Chief Resident
Stanford University School of Medicine
Stanford, CA, USA

Case 20: Sphenoid Wing Meningioma

Kevin K.H. Chow, MD, PhD

Neurosurgery Resident
Department of Neurosurgery
Stanford University School of Medicine
Palo Alto, CA, USA

Case 26: Glioblastoma

Case 31: Brain Metastases

Joseph D. Ciacci, MD

Program Director UCSD Neurosurgery
Residency
Academic Community Director
UCSD School of Medicine
Chief of Neurosurgery VASDHS
Professor, Division of Neurosurgery
University of California, San Diego
School of Medicine
San Diego, CA, USA

Section Editor for Section 3

Neurosurgical Trauma

Case 38: Penetrating Head Injury

Case 39: Intractable Intracranial
Pressure

Case 40: Epidural Hematoma

Case 41: Chronic Subdural Hematoma

Case 42: Subaxial Cervical Fracture

Case 43: Odontoid Fractures

Case 44: Hangman's Fracture

Case 45: Thoracolumbar Burst
Fractures

Case 46: Chance Fractures

Case 47: Jumped Cervical Facets

Aaron Cohen-Gadol, MD

Associate Professor
Department of Neurosurgery
Indiana University School of Medicine
Indianapolis, IN, USA

Case 73: Hemifacial Spasm

John R. Crawford, MD, PhD

Associate Professor of Clinical
Neurosciences and Pediatrics
University of California – San Diego
Director Neuro-Oncology Rady Children's
Hospital
San Diego, CA, USA

Case 63: Cerebellar Medulloblastoma

Case 64: Brainstem Glioma

Case 65: Hypothalamic Hamartoma

Case 66: Endoscopic Third

Ventriculostomy

Case 67: Slit Ventricle Syndrome

Case 71: Pilocytic Astrocytoma

Erik I. Curtis, MD

Neurosurgical Resident
Division of Neurosurgery
University of California, San Diego
School of Medicine
San Diego, CA, USA

Case 41: Chronic Subdural Hematoma

Case 42: Subaxial Cervical Fracture

Case 43: Odontoid Fractures

Case 45: Thoracolumbar Burst
Fractures

Gehaan D'Souza, MD

Fellow in Plastic Surgery
Department of Plastic Surgery
University of California
San Diego School of Medicine
San Diego, CA, USA

Case 89: Radial Nerve Injury

Benjamin D. Elder, MD, PhD

Resident
Department of Neurosurgery
The Johns Hopkins University School of
Medicine
Baltimore, MD, USA

Case 79: Idiopathic Intracranial

Hypertension (Pseudotumor Cerebri)

Nicholas Fain, MD

Resident Physician
Department of Radiology
University of Iowa
Iowa City, IA, USA

Case 42: Subaxial Cervical Fracture

Brandon C. Gabel, MD

Neurosurgical Resident
Division of Neurosurgery
University of California, San Diego
School of Medicine
San Diego, CA, USA

Case 15: Moyamoya Disease

Case 16: Venous Sinus Thrombosis

Case 38: Penetrating Head Injury

Case 39: Intractable Intracranial
Hypertension

Case 40: Epidural Hematoma

Case 41: Chronic Subdural Hematoma

Case 42: Subaxial Cervical Fracture

Case 43: Odontoid Fractures

Case 44: Hangman's Fracture

Case 45: Thoracolumbar Burst

Fractures

Case 46: Chance Fractures

Case 47: Jumped Cervical Facets

Case 70: Vein of Galen Malformations

Gurpreet S. Gandhoke, MD

Department of Neurological Surgery
University of Pittsburgh Medical Center
Pittsburgh, PA, USA

Case 48: Atlanto-Axial Dislocation

Case 51: Cauda Equina Syndrome

Melanie G. Hayden Gephart, MD

Assistant Professor
Department of Neurosurgery
Stanford University School of Medicine
Stanford, CA, USA

Case 24: Pituitary Macroadenoma
– Prolactinoma

Case 27: Anaplastic

Oligodendroglioma

Case 32: Intraventricular Colloid Cyst

Case 35: Ependymoma

Case 61: Pineal Tumor

Thomas J. Gianaris, MD

Resident
Department of Neurosurgery
Indiana University School of Medicine
Indianapolis, IN, USA

Case 73: Hemifacial Spasm

Gunjan Goel, MD

Neurosurgical Resident
Division of Neurosurgery
University of California – San Diego
San Diego, CA, USA

Case 5: Intradural Internal Carotid
Artery Fusiform Aneurysm

David D. Gonda, MD

Neurosurgery Chief Resident
 Division of Neurosurgery
 University of California – San Diego
 San Diego, CA, USA

[Case 25: Craniopharyngioma](#)

C. Rory Goodwin, MD, PhD

Resident
 Department of Neurosurgery
 The Johns Hopkins University School of
 Medicine
 Baltimore, MD, USA

[Case 79: Idiopathic Intracranial
 Hypertension \(Pseudotumor Cerebri\)](#)

Li Gordon, MD

Assistant Professor, Department of
 Neurosurgery
 Stanford University School of Medicine
 Stanford, CA, USA

[Case 30: CNS Lymphoma](#)

Griffith R. Harsh IV, MD

Professor
 Department of Neurosurgery
 Stanford Hospital and Clinics
 Stanford, CA, USA

[Section Editor for Section 2 Non-
 traumatic Cranial Lesions](#)
[Case 21: Cerebellar Cystic
 Hemangioblastoma](#)

Todd Harshbarger, MD

Neurosurgery Division, City of Hope
 Duarte, CA, USA

[Case 55: Spinal Metastases](#)

David S. Hong, MD

Pediatric Neurosurgery Fellow
 Division of Pediatric Neurosurgery
 Rady Children's Hospital San Diego
 University of California – San Diego
 San Diego, CA, USA

[Case 67: Slit Ventricle Syndrome](#)

Reid Hoside, MD

Neurosurgical Resident
 Division of Neurosurgery
 University of California – San Diego
 San Diego, CA, USA

[Case 7: Cranial Dural Arteriovenous
 Fistula](#)
[Case 14: Cerebellar Hemorrhage](#)

Rahul Jandial, MD, PhD

Associate Professor
 Division of Neurosurgery, Department of
 Surgery
 City of Hope Cancer Center & Beckman
 Research Institute
 Los Angeles, CA, USA

Henry Jung, MD

Neurosurgery Resident
 Department of Neurosurgery
 Stanford Hospital and Clinics
 Stanford, CA, USA

[Case 33: Cerebral Abscess](#)
[Case 34: Chiari I Malformation](#)

Adam S. Kanter, MD

Associate Professor
 Department of Neurological Surgery
 University of Pittsburgh Medical Center
 Pittsburgh, PA, USA

[Section Editor for Section 4 Spinal
 Neurosurgery](#)
[Case 48: Atlanto-Axial Dislocation](#)
[Case 49: Basilar Invagination –
 Rheumatoid Pannus](#)
[Case 50: Cervical Spondylotic
 Myelopathy](#)
[Case 51: Cauda Equina Syndrome](#)
[Case 52: Foot Drop and Far Lateral
 Disc Herniation](#)
[Case 53: Thoracic Disc Herniation](#)
[Case 54: Spinal Epidural Abscess](#)
[Case 56: Spinal Intradural
 Extradurellary Mass](#)
[Case 57: Intradural Intramedullary
 Mass](#)
[Case 58: Cervical Ossified Posterior
 Longitudinal Ligament](#)
[Case 59: Ankylosing Spondylitis](#)
[Case 60: Chordoma](#)

Michael G. Kaplitt, MD, PhD

Residency Director and Vice Chairman
 for Research

Department of Neurological Surgery
 Weill Cornell Medical College
 New York Presbyterian Hospital
 New York, NY, USA

[Case 80: Intractable Oncologic Pain](#)

Aasim S. Kazmi, MD

Section of Neurosurgery
 Meridian Health
 Wall, NJ, USA

[Section Editor for Appendices](#)

Alexander A. Khalessi, MD

Director of Endovascular Neurosurgery
 Surgical Director of Neurocritical Care
 Assistant Professor of Surgery and
 Neurosciences
 University of California – San Diego
 San Diego, CA, USA

Section Editor for Section 1 Vascular
 Neurosurgery

Case 1: Cerebral Arteriovenous
 Malformation

Case 2: Cavernous Malformation

Case 3: Ruptured Middle Cerebral
 Artery Aneurysm

Case 4: Unruptured Anterior
 Communicating Artery Aneurysm

Case 5: Intradural Internal Carotid
 Artery Fusiform Aneurysm

Case 6: Spinal Arteriovenous
 Malformations

Case 7: Cranial Dural Arteriovenous
 Fistula

Case 8: Spinal Dural Arteriovenous
 Fistulas

Case 9: Vertebral Artery Dissection

Case 10: Basilar Tip Aneurysm

Case 11: Endovascular Treatment of
 Unruptured Aneurysms

Case 12: Dominant Hemisphere
 Hemorrhagic Stroke

Case 13: Hypertensive Thalamic
 Hemorrhage

Case 14: Cerebellar Hemorrhage

Case 15: Moyamoya Disease

Case 16: Venous Sinus Thrombosis

Case 17: Carotid Stenosis

Case 18: Ischemic Stroke

Management

Andrew L. Ko, MD

Fellow, Stereotactic and Functional
 Neurosurgery
 Department of Neurological Surgery
 Oregon Health and Science University
 Portland, OR, USA

Case 72: Trigeminal Neuralgia

Audrey Kohar, DO

Physical Medicine and Rehabilitation
 University of California
 Irvine, CA, USA

Case 92: Multiple Sclerosis

Case 95: Devic's Syndrome

Case 99: Transverse Myelitis

Thomas A. Kosztowski, MD

Resident
 Department of Neurosurgery
 The Johns Hopkins University School of
 Medicine
 Baltimore, MD, USA

Case 79: Idiopathic Intracranial
 Hypertension (Pseudotumor Cerebri)

Christine K. Lee, MD, PhD

MD/PhD Student
 Stanford University School of Medicine
 Stanford, CA, USA

Case 27: Anaplastic
 Oligodendroglioma

Paul S. Larson, MD

Professor and Vice Chair
 Department of Neurological Surgery
 University of California – San Francisco
 San Francisco, CA, USA

Section Editor for Section 6
 Stereotactic and Functional
 Neurosurgery

Dillon Levy

Pre-Medical Student
 University of San Diego
 San Diego, CA, USA

Case 69: Craniosynostosis
 – Plagiocephaly

Michael L. Levy, MD, PhD

Professor and Chief
 Division of Pediatric Neurosurgery
 Rady Children's Hospital – San Diego
 San Diego, CA, USA

Section Editor for Section 5 Pediatric
 Neurosurgery

Case 25: Craniopharyngioma

Case 61: Pineal Tumor

Case 62: Myelomeningocele

Case 63: Cerebellar Medulloblastoma

Case 64: Brainstem Glioma

Case 65: Hypothalamic Hamartoma

Case 66: Endoscopic Third

Ventriculostomy

Case 67: Slit Ventricle Syndrome

Case 68: Neural Tube Defect–Tethered
 Cord Syndrome

Case 69: Craniosynostosis

– Plagiocephaly

Case 70: Vein of Galen Malformations

Case 71: Pilocytic Astrocytoma

Robert M. Lober, MD, PhD

Chief Resident
 Department of Neurosurgery
 Stanford Hospitals and Clinics
 Stanford, CA, USA
 Case 19: Vestibular Schwannoma

Matthew G. MacDougall, MD

Neurosurgery Resident
 Division of Neurosurgery
 University of California – San Diego
 San Diego, CA, USA
 Case 25: Craniopharyngioma

Mark A. Mahan, MD

Assistant Professor
 Department of Neurosurgery
 Clinical Neurosciences Center
 University of Utah
 Salt Lake City, UT, USA
 Case 82: Thoracic Outlet Syndrome
 Case 83: Peroneal Neuropathy
 Case 84: Nerve Sheath Tumor
 Case 85: Cubital Tunnel Syndrome
 Case 86: Carpal Tunnel Syndrome
 Case 87: Brachial Plexus Injury
 Case 88: Parsonage-Turner Syndrome
 Case 89: Radial Nerve Injury
 Case 90: Ulnar Nerve Injury
 Case 91: Median Nerve Injury

Joel R. Martin, MD

Neurosurgical Resident
 Division of Neurosurgery
 University of California-San Diego
 San Diego, CA, USA
 Case 18: Ischemic Stroke
 Management

Hazem Mashaly, MD

University of Pittsburgh Medical Center
 Pittsburgh, PA, USA
 Case 56: Spinal Intradural
 Extramedullary Mass
 Case 57: Spinal Intramedullary Mass
 Case 58: Cervical Ossified Posterior
 Longitudinal Ligament

Michael M. McDowell, MD

Department of Neurological Surgery
 University of Pittsburgh Medical Center
 Pittsburgh, PA, USA
 Case 59: Ankylosing Spondylitis
 Case 60: Chordoma

Zachary Medress

Medical Student
 Stanford University School of Medicine
 Stanford, CA, USA
 Case 30: CNS Lymphoma
 Case 35: Ependymoma

Hal S. Meltzer, MD

Neurosurgical Director of Craniofacial
 Program
 Rady Children's Hospital San Diego
 Professor of Neurosurgery
 University of California, San Diego
 San Diego, CA, USA
 Case 68: Neural Tube Defect–Tethered
 Cord Syndrome
 Case 69: Craniosynostosis
 – Plagiocephaly

Kai Miller, MD

Resident, Department of Neurosurgery
 Stanford University School of Medicine
 Stanford, CA, USA
 Case 30: CNS Lymphoma

Robert A. Miller, MD

Department of Neurological Surgery
 University of Pittsburgh Medical Center
 Pittsburgh, PA, USA
 Case 49: Basilar Invagination –
 Rheumatoid Pannus

Nelson Moussazadeh, MD

Resident in Neurological Surgery
 Weill Cornell Medical College
 New York Presbyterian Hospital
 New York, NY, USA
 Case 80: Intractable Oncologic Pain

Peter Nakaji, MD

Residency Program Director
 Division of Neurological Surgery
 Barrow Neurological Institute
 St. Joseph's Hospital and Medical Center
 Phoenix, AZ, USA
 Case 75: Progressive Spastic
 Paraparesis and Decreased Mobility in
 a Young Patient
 Case 78: Normal Pressure
 Hydrocephalus

Bond Nguyen

University of California – Irvine
 Irvine, CA, USA
 Case 61: Pineal Tumor
 Case 62: Myelomeningocele

Scott E. Olson, MD

Assistant Professor of Surgery and
Neurosciences
Division of Neurosurgery
University of California – San Diego
San Diego, CA, USA

- Case 8: Spinal Dural Arteriovenous
Fistulas
- Case 12: Dominant Hemisphere
Hemorrhagic Stroke
- Case 18: Ischemic Stroke
Management

J. Scott Pannell, MD

Endovascular Neurosurgery Fellow
Division of Neurosurgery
University of California – San Diego
San Diego, CA, USA

- Case 1: Cerebral Arteriovenous
Malformation
- Case 2: Cavernous Malformation
- Case 3: Ruptured Middle Cerebral
Artery Aneurysm
- Case 4: Unruptured Anterior
Communicating Artery Aneurysm
- Case 5: Intradural Internal Carotid
Artery Fusiform Aneurysm
- Case 6: Spinal Arteriovenous
Malformations
- Case 7: Cranial Dural Arteriovenous
Fistula
- Case 8: Spinal Dural Arteriovenous
Fistulas
- Case 9: Vertebral Artery Dissection
- Case 10: Basilar Tip Aneurysm
- Case 11: Endovascular Treatment of
Unruptured Aneurysms
- Case 12: Dominant Hemisphere
Hemorrhagic Stroke
- Case 13: Hypertensive Thalamic
Hemorrhage
- Case 14: Cerebellar Hemorrhage
- Case 15: Moyamoya Disease
- Case 16: Venous Sinus Thrombosis
- Case 17: Carotid Stenosis
- Case 18: Ischemic Stroke
Management

Arjun V. Pendharkar, MD

Department of Neurosurgery
Stanford University School of Medicine
Palo Alto, CA, USA

- Case 32: Intraventricular Colloid Cyst

Neal Prakash, MD, PhD

City of Hope National Medical Center
Chief of Neurology
Associate Clinical Professor of Neurology
Director of Neurological Optical Imaging
Duarte, CA, USA

- Section Editor for Section 8
Neurology
- Case 92: Multiple Sclerosis
- Case 95: Devic's Syndrome
- Case 97: Status Epilepticus
- Case 99: Transverse Myelitis

Robert C. Rennert, MD

Neurosurgical Resident
Division of Neurosurgery
University of California – San Diego
San Diego, CA, USA

- Case 9: Vertebral Artery Dissection
- Case 10: Basilar Tip Aneurysm
- Case 12: Dominant Hemisphere
Hemorrhagic Stroke
- Case 36: Normal Pressure
Hydrocephalus

Christian B. Ricks, MD

Department of Neurological Surgery
University of Pittsburgh Medical Center
Pittsburgh, PA, USA

- Case 50: Cervical Spondylotic
Myelopathy
- Case 52: Foot Drop and Far Lateral
Disc Herniation
- Case 54: Spinal Epidural Abscess

Daniele Rigamonti, MD

Professor
Department of Neurosurgery
The Johns Hopkins University School of
Medicine
Baltimore, MD

- Case 79: Idiopathic Intracranial
Hypertension (Pseudotumor Cerebri)

Nathan C. Rowland, MD, PhD

Chief Resident
Department of Neurological Surgery
University of California – San Francisco
San Francisco, CA, USA

- Case 76: Mesial Temporal Sclerosis

Jayson A. Sack, MD

Neurosurgical Resident
 Division of Neurosurgery
 University of California – San Diego
 San Diego, CA, USA

Case 3: Ruptured Middle Cerebral Artery Aneurysm

Case 4: Unruptured Anterior Communicating Artery Aneurysm

Case 9: Vertebral Artery Dissection

Case 10: Basilar Tip Aneurysm

Noriko Salamon, MD, PhD

Professor of Radiology
 Chief of Neuroradiology
 Section of Neuroradiology
 Department of Radiological Sciences
 David Geffen School of Medicine at UCLA

Ronald Reagan Medical Center
 Los Angeles, CA, USA

Case 95: Devic's Syndrome

David R. Santiago-Dieppa, MD

Neurosurgical Resident
 Division of Neurosurgery
 University of California – San Diego
 San Diego, CA, USA

Case 8: Spinal Dural Arteriovenous Fistulas

Case 39: Intractable Intracranial Hypertension

Aatman Shah, BS

Medical Student
 Department of Neurosurgery
 Stanford Hospital and Clinics
 Stanford, CA, USA

Case 33: Cerebral Abscess

Case 34: Chiari I Malformation

Andrew Shetter, MD

Chair, Section of Functional Stereotactic Neurosurgery
 Division of Neurological Surgery
 Barrow Neurological Institute
 St. Joseph's Hospital and Medical Center
 Phoenix, AZ, USA

Case 75: Progressive Spastic Paraparesis and Decreased Mobility in a Young Patient

Jason W. Signorelli

Medical Student
 Division of Neurosurgery
 University of California – San Diego
 San Diego, CA, USA

Case 1: Cerebral Arteriovenous Malformation

Case 13: Hypertensive Thalamic Hemorrhage

Konstantin V. Slavin, MD

Professor
 Department of Neurosurgery
 University of Illinois at Chicago
 Chicago, IL, USA

Case 81: Spinal Cord Stimulation

Alexa Smith, MD

Pediatric Neurosurgery Fellow
 Rady Children's Hospital – San Diego
 Division of Pediatric Neurosurgery
 University of California, San Diego
 San Diego, CA, USA

Case 61: Pineal Tumor

Case 62: Myelomeningocele

Case 63: Cerebellar Medulloblastoma

Case 64: Brainstem Glioma

Case 65: Hypothalamic Hamartoma

Case 66: Endoscopic Third Ventriculostomy

Case 67: Slit Ventricle Syndrome

Case 68: Neural Tube Defect–Tethered Cord Syndrome

Case 69: Craniosynostosis

– Plagiocephaly

Case 71: Pilocytic Astrocytoma

Matthew D. Smyth, MD

Associate Professor of Neurosurgery and Pediatrics

Director, Pediatric Epilepsy Program
 Department of Neurological Surgery
 Washington University School of Medicine

St. Louis, MO, USA

Case 77: Corpus Callosotomy

Philip A. Starr, MD, PhD

Professor and Co-Director, Functional Neurosurgery Program
 Department of Neurological Surgery
 University of California – San Francisco
 San Francisco, CA, USA

Case 74: Parkinson's Disease

Jeffrey A. Steinberg, MD

Division of Neurosurgery
University of California – San Diego
San Diego, CA, USA

Case 2: Cavernous Malformation
Case 17: Carotid Stenosis
Case 70: Vein of Galen Malformations

YouRong Sophie Su

Medical Student
Stanford University School of Medicine
Stanford, CA, USA

Case 24: Pituitary Macroadenoma
– Prolactinoma

Zachary J. Tempel, MD

Department of Neurological Surgery
University of Pittsburgh Medical Center
Pittsburgh, PA, USA

Case 49: Basilar Invagination –
Rheumatoid Pannus
Case 53: Thoracic Disc Herniation
Case 56: Spinal Intradural
Extramedullary Mass
Case 57: Intradural Intramedullary
Mass
Case 59: Ankylosing Spondylitis
Case 60: Chordoma

Doris D. Wang, MD, PhD

Resident Physician
Department of Neurological Surgery
University of California – San Francisco
San Francisco, CA, USA

Case 74: Parkinson's Disease

J. Dawn Waters, MD

Clinical Instructor
Department of Neurosurgery
Stanford Hospital and Clinics
Stanford, CA, USA

Section Editor for Section 2 Non-
traumatic Cranial Lesions
Case 21: Cerebellar Cystic
Hemangioblastoma
Case 23: Cushing's Microadenoma
Case 29: Radiation Necrosis versus
Tumor Recurrence
Case 36: Normal Pressure
Hydrocephalus
Case 37: Arachnoid Cyst

Christina Huang Wright, MD

Resident Physician
Department of Neurological Surgery
University of Southern California School
of Medicine
Los Angeles, CA, USA

Case 22: Pituitary Apoplexy
Case 28: Low-Grade Glioma

James Wright, MD

Resident Physician
Department of Neurological Surgery
Case Western Reserve University School
of Medicine
Cleveland, OH, USA

Case 22: Pituitary Apoplexy
Case 28: Low-Grade Glioma

David S. Xu, MD

Resident Physician
Division of Neurological Surgery
Barrow Neurological Institute
St. Joseph's Hospital and Medical Center
Phoenix, AZ, USA

Case 78: Normal Pressure
Hydrocephalus

Derek Yecies, MD

Resident
Department of Neurosurgery
Stanford Hospitals and Clinics
Stanford, CA, USA

Case 29: Radiation Necrosis versus
Tumor Recurrence

Nathan T. Zwagerman, MD

Department of Neurological Surgery
University of Pittsburgh Medical Center
Pittsburgh, PA, USA

Case 50: Cervical Spondylotic
Myelopathy

Acknowledgements

For those that have not had the opportunity to assemble a text, the immense collaborative effort can be lost behind the bold, large font names on the cover. Yes, the editors are key to the process. Equally important is the publishing team. Alexandra Mortimer, Louisa Talbott and Andrew Riley have been thoughtful and attentive companions in making this book. The book would be porous and flawed without them. Most importantly Charlotta Kryhl has helped shepherd us through the original idea, its need in the neurosurgical community and ultimately the spirit of this textbook. Thank you for your support and leadership.



*For boundless love
For unwavering support
For my mother, Sushma Jandial*
Rahul Jandial

This page intentionally left blank

*Chen, Ph.D, for gifting me his disdain of the conventional-and
to my mother, Professor S.J. Chen,
for my brutal endurance and voice of reason.*

Mike Y. Chen

*I am grateful to all of my colleagues for their collaboration,
expertise, and friendship. I am appreciative of our residents
who motivate us to be even better. Also, my patients,
who inspire me to persevere.*

*I dedicate this book to family: My mother, Lenore, for her endless
commitment to our happiness. My father, Stephen, who is missed
beyond words. My in-laws, Shari and Ali, for their undying love
and support. My husband, Shervin, for his sacrifices for my
dedication to my profession. My children, Ava and Cyrus,
who have enriched my life in ways I never thought possible,
making me a better person and surgeon.*

Michele R. Aizenberg

This page intentionally left blank

Section I Vascular Neurosurgery

Case 1

Cerebral Arteriovenous Malformation

Jason W. Signorelli ● J. Scott Pannell, MD ●
Alexander A. Khalessi, MD

Presentation

An 18-year-old female presents to the ED with severe headaches, nausea, vomiting, and complex partial seizure beginning on the right side of the body. She has no history of prior seizures. She has had headaches in the past, but this headache is worse than usual.

- PMH: otherwise unremarkable; no recent trauma
- Exam: mild left-sided weakness

Differential Diagnosis

- Vascular
 - Ischemic/embolic stroke
 - Arteriovenous malformation (AVM)
 - Cavernous hemangioma
 - Aneurysm rupture
 - Moyamoya disease
- Infectious
 - CNS infection (herpes simplex encephalitis)
- Neoplastic
 - Primary cerebral tumor
 - Metastasis (most commonly lung, renal cell carcinoma, melanoma, breast)
- Metabolic/toxic/nutritional
 - Alcohol withdrawal
 - Drug intoxication
 - Electrolyte abnormalities
 - Hypoglycemia
- Congenital/developmental
 - Osler-Weber-Rendu disease
 - Sturge-Weber syndrome
 - Wyburn-Mason syndrome (“Bonnet–Dechaume–Blanc syndrome”)

Initial Imaging

FIGURE 1-1

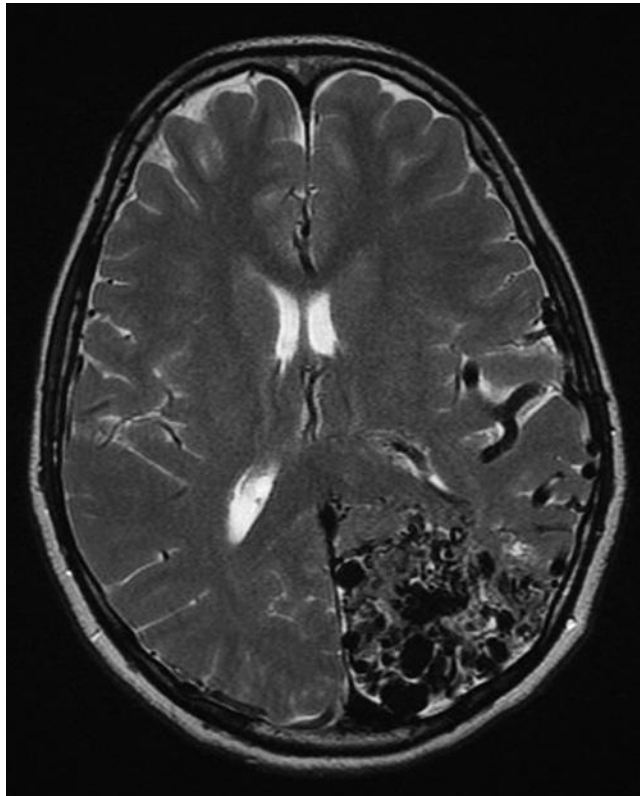


FIGURE 1-2