

TABLE OF CONTENTS



Part I: Pathology-Based Diagnoses

SECTION 1: CONGENITAL MALFORMATIONS	
4	Congenital Malformations Overview <i>A. James Barkovich, MD</i>
HINDBRAIN HERNIATIONS, MISCELLANEOUS MALFORMATIONS	
8	Chiari 1 <i>Susan I. Blaser, MD, FRCPC and Anne G. Osborn, MD, FACR</i>
12	Chiari 2 <i>Susan I. Blaser, MD, FRCPC and Kevin R. Moore, MD</i>
16	Chiari 3 <i>Susan I. Blaser, MD, FRCPC and Kevin R. Moore, MD</i>
18	Callosal Dysgenesis <i>Charles Raybaud, MD, FRCPC and Anne G. Osborn, MD, FACR</i>
22	Lipoma <i>A. James Barkovich, MD</i>
HINDBRAIN MALFORMATIONS	
26	Dandy-Walker Continuum <i>Susan I. Blaser, MD, FRCPC</i>
30	Rhombencephalosynapsis <i>Blaise V. Jones, MD and Anne G. Osborn, MD, FACR</i>
34	Unclassified Cerebellar Dysplasias <i>Blaise V. Jones, MD</i>
36	Molar Tooth Malformations (Joubert) <i>Charles Raybaud, MD, FRCPC and Anne G. Osborn, MD, FACR</i>
DISORDERS OF DIVERTICULATION/CLEAVAGE	
40	Holoprosencephaly <i>Charles Raybaud, MD, FRCPC and Anne G. Osborn, MD, FACR</i>
44	Holoprosencephaly Variants <i>Anna Illner, MD</i>
48	Syntelencephaly (Middle Interhemispheric Variant) <i>Charles Raybaud, MD, FRCPC</i>
52	Septooptic Dysplasia <i>A. James Barkovich, MD</i>
MALFORMATIONS OF CORTICAL DEVELOPMENT	
56	Microcephaly <i>Gary L. Hedlund, DO</i>
60	Congenital Muscular Dystrophy <i>Charles Raybaud, MD, FRCPC</i>
64	Heterotopic Gray Matter <i>Charles Raybaud, MD, FRCPC</i>
68	Polymicrogyria <i>A. James Barkovich, MD</i>
72	Lissencephaly <i>Blaise V. Jones, MD</i>
76	Schizencephaly <i>Blaise V. Jones, MD</i>
80	Hemimegalencephaly <i>Anne G. Osborn, MD, FACR and Blaise V. Jones, MD</i>
FAMILIAL TUMOR/NEUROCUTANEOUS SYNDROMES	
84	Neurofibromatosis Type 1 <i>Gilbert Vézina, MD and Anne G. Osborn, MD, FACR</i>
88	Neurofibromatosis Type 2 <i>Gilbert Vézina, MD</i>
92	von Hippel-Lindau Syndrome <i>Anne G. Osborn, MD, FACR and Gilbert Vézina, MD</i>
96	Tuberous Sclerosis Complex <i>Gilbert Vézina, MD and Anne G. Osborn, MD, FACR</i>
100	Sturge-Weber Syndrome <i>Gilbert Vézina, MD and Anne G. Osborn, MD, FACR</i>
104	Meningioangiomatosis <i>Anne G. Osborn, MD, FACR</i>
106	Basal Cell Nevus Syndrome <i>Gilbert Vézina, MD</i>
110	Hereditary Hemorrhagic Telangiectasia <i>Anne G. Osborn, MD, FACR and Charles Raybaud, MD, FRCPC</i>
114	Encephalocraniocutaneous Lipomatosis <i>Gilbert Vézina, MD</i>
118	Lhermitte-Duclos Disease <i>Anne G. Osborn, MD, FACR and P. Ellen Grant, MD</i>
122	Neurocutaneous Melanosis <i>Gilbert Vézina, MD</i>
126	Aicardi Syndrome <i>P. Ellen Grant, MD</i>
128	Li-Fraumeni Syndrome <i>Gilbert Vézina, MD</i>
130	Schwannomatosis <i>Nicholas A. Koontz, MD</i>

TABLE OF CONTENTS

SECTION 2: TRAUMA

- 134 **Introduction to CNS Imaging, Trauma**
Anne G. Osborn, MD, FACR

PRIMARY EFFECTS OF CNS TRAUMA

- 140 **Scalp and Skull Injuries**
Anne G. Osborn, MD, FACR
- 144 **Missile and Penetrating Injury**
Anne G. Osborn, MD, FACR and Sheri L. Harder, MD, FRCPC
- 148 **Epidural Hematoma, Classic**
Anne G. Osborn, MD, FACR and Gregory L. Katzman, MD, MBA
- 152 **Epidural Hematoma, Variant**
Anne G. Osborn, MD, FACR
- 156 **Acute Subdural Hematoma**
Anne G. Osborn, MD, FACR and Bronwyn E. Hamilton, MD
- 160 **Subacute Subdural Hematoma**
Anne G. Osborn, MD, FACR and Bronwyn E. Hamilton, MD
- 164 **Chronic Subdural Hematoma**
Anne G. Osborn, MD, FACR
- 168 **Traumatic Subarachnoid Hemorrhage**
Anne G. Osborn, MD, FACR and Gregory L. Katzman, MD, MBA
- 172 **Cerebral Contusion**
Anne G. Osborn, MD, FACR
- 176 **Diffuse Axonal Injury**
Anne G. Osborn, MD, FACR
- 180 **Subcortical Injury**
Anne G. Osborn, MD, FACR and Gregory L. Katzman, MD, MBA
- 184 **Pneumocephalus**
Anne G. Osborn, MD, FACR and Gregory L. Katzman, MD, MBA
- 188 **Abusive Head Trauma**
Gary L. Hedlund, DO

SECONDARY EFFECTS OF CNS TRAUMA

- 192 **Intracranial Herniation Syndromes**
Anne G. Osborn, MD, FACR
- 196 **Post-Traumatic Brain Swelling**
Anne G. Osborn, MD, FACR
- 200 **Traumatic Cerebral Ischemia/Infarction**
Anne G. Osborn, MD, FACR and Gregory L. Katzman, MD, MBA
- 204 **Brain Death**
Anne G. Osborn, MD, FACR
- 206 **Second Impact Syndrome**
Anne G. Osborn, MD, FACR
- 208 **Traumatic Intracranial Arterial Dissection**
Anne G. Osborn, MD, FACR
- 212 **Traumatic Carotid Cavernous Fistula**
Anne G. Osborn, MD, FACR and Perry P. Ng, MBBS (Hons), FRANZCR
- 214 **Chronic Traumatic Encephalopathy**
Anne G. Osborn, MD, FACR

SECTION 3: SUBARACHNOID HEMORRHAGE AND ANEURYSMS

- 218 **Subarachnoid Hemorrhage & Aneurysms Overview**
Anne G. Osborn, MD, FACR

SUBARACHNOID HEMORRHAGE

- 220 **Aneurysmal Subarachnoid Hemorrhage**
Anne G. Osborn, MD, FACR
- 224 **Perimesencephalic Nonaneurysmal SAH**
Anne G. Osborn, MD, FACR
- 226 **Convexal Subarachnoid Hemorrhage**
Anne G. Osborn, MD, FACR
- 228 **Superficial Siderosis**
Anne G. Osborn, MD, FACR and H. Ric Harnsberger, MD

ANEURYSMS

- 232 **Saccular Aneurysm**
Anne G. Osborn, MD, FACR and Perry P. Ng, MBBS (Hons), FRANZCR
- 236 **Pseudoaneurysm**
Anne G. Osborn, MD, FACR
- 238 **Vertebrobasilar Dolichoectasia**
Anne G. Osborn, MD, FACR
- 240 **ASVD Fusiform Aneurysm**
Anne G. Osborn, MD, FACR
- 242 **Non-ASVD Fusiform Aneurysm**
Anne G. Osborn, MD, FACR
- 244 **Blood Blister-Like Aneurysm**
Anne G. Osborn, MD, FACR

SECTION 4: STROKE

- 248 **Stroke Overview**
Karen L. Salzman, MD

NONTRAUMATIC INTRACRANIAL HEMORRHAGE

- 254 **Evolution of Intracranial Hemorrhage**
Karen L. Salzman, MD and Ulrich Rassner, MD
- 258 **Spontaneous Nontraumatic Intracranial Hemorrhage**
Karen L. Salzman, MD and Laurie A. Loevner, MD
- 262 **Hypertensive Intracranial Hemorrhage**
Karen L. Salzman, MD and Laurie A. Loevner, MD
- 266 **Remote Cerebellar Hemorrhage**
Karen L. Salzman, MD and Bronwyn E. Hamilton, MD
- 268 **Germinal Matrix Hemorrhage**
Karen L. Salzman, MD and P. Ellen Grant, MD

ATHEROSCLEROSIS AND CAROTID STENOSIS

- 272 **Intracranial Atherosclerosis**
Anne G. Osborn, MD, FACR
- 276 **Extracranial Atherosclerosis**
Karen L. Salzman, MD and Bronwyn E. Hamilton, MD
- 280 **Arteriolosclerosis**
Karen L. Salzman, MD

TABLE OF CONTENTS

NONATHEROMATOUS VASCULOPATHY

- 284 Aberrant Internal Carotid Artery**
Karen L. Salzman, MD and H. Ric Harnsberger, MD
- 288 Persistent Carotid Basilar Anastomoses**
Karen L. Salzman, MD and Charles Raybaud, MD, FRCPC
- 290 Sickle Cell Disease, Brain**
Anna Illner, MD
- 294 Moyamoya**
Anne G. Osborn, MD, FACR and Anna Illner, MD
- 298 Primary Arteritis of the CNS**
Anne G. Osborn, MD, FACR
- 302 Miscellaneous Vasculitis**
Anne G. Osborn, MD, FACR
- 306 Reversible Cerebral Vasoconstriction Syndrome**
Karen L. Salzman, MD and Perry P. Ng, MBBS (Hons), FRANZCR
- 308 Vasospasm**
Karen L. Salzman, MD and Perry P. Ng, MBBS (Hons), FRANZCR
- 312 Systemic Lupus Erythematosus**
Karen L. Salzman, MD and Gary M. Nesbit, MD
- 316 Cerebral Amyloid Disease**
Karen L. Salzman, MD and Bronwyn E. Hamilton, MD
- 320 CADASIL**
Karen L. Salzman, MD and Ulrich Rassner, MD
- 324 Behçet Disease**
Karen L. Salzman, MD
- 326 Susac Syndrome**
Karen L. Salzman, MD and Jeffrey S. Anderson, MD, PhD
- 328 Fibromuscular Dysplasia**
Karen L. Salzman, MD and Perry P. Ng, MBBS (Hons), FRANZCR

CEREBRAL ISCHEMIA AND INFARCTION

- 330 Hydranencephaly**
Anne G. Osborn, MD, FACR
- 332 White Matter Injury of Prematurity**
P. Ellen Grant, MD
- 336 Term Hypoxic Ischemic Injury**
P. Ellen Grant, MD
- 340 Adult Hypoxic Ischemic Injury**
Karen L. Salzman, MD and Lubdha M. Shah, MD
- 344 Hypotensive Cerebral Infarction**
Anne G. Osborn, MD, FACR and Bronwyn E. Hamilton, MD
- 348 Childhood Stroke**
Anne G. Osborn, MD, FACR and Blaise V. Jones, MD
- 352 Cerebral Hemiatrophy**
Karen L. Salzman, MD
- 354 Acute Cerebral Ischemia-Infarction**
Anne G. Osborn, MD, FACR and Edward P. Quigley, III, MD, PhD
- 358 Subacute Cerebral Infarction**
Karen L. Salzman, MD and Sheri L. Harder, MD, FRCPC
- 362 Chronic Cerebral Infarction**
Sheri L. Harder, MD, FRCPC and Anne G. Osborn, MD, FACR
- 366 Multiple Embolic Cerebral Infarctions**
Karen L. Salzman, MD

- 367 Fat Emboli Cerebral Infarction**
Karen L. Salzman, MD
- 368 Lacunar Infarction**
Karen L. Salzman, MD and Ulrich Rassner, MD
- 372 Cerebral Hyperperfusion Syndrome**
Anne G. Osborn, MD, FACR
- 376 Dural Sinus Thrombosis**
Anne G. Osborn, MD, FACR
- 380 Cortical Venous Thrombosis**
Anne G. Osborn, MD, FACR and Bronwyn E. Hamilton, MD
- 384 Deep Cerebral Venous Thrombosis**
Anne G. Osborn, MD, FACR and Bronwyn E. Hamilton, MD
- 388 Dural Sinus and Aberrant Arachnoid Granulations**
H. Ric Harnsberger, MD

SECTION 5: VASCULAR MALFORMATIONS

- 394 Vascular Malformations Overview**
Anne G. Osborn, MD, FACR

CVMS WITH AV SHUNTING

- 396 Arteriovenous Malformation**
Anne G. Osborn, MD, FACR and Perry P. Ng, MBBS (Hons), FRANZCR
- 400 Dural AV Fistula**
Anne G. Osborn, MD, FACR and Perry P. Ng, MBBS (Hons), FRANZCR
- 404 Pial AV Fistula**
Anne G. Osborn, MD, FACR
- 406 Vein of Galen Aneurysmal Malformation**
Anne G. Osborn, MD, FACR and Anna Illner, MD

CVMS WITHOUT AV SHUNTING

- 410 Developmental Venous Anomaly**
Anne G. Osborn, MD, FACR
- 416 Sinus Pericranii**
Anne G. Osborn, MD, FACR and Anna Illner, MD
- 420 Cavernous Malformation**
Anne G. Osborn, MD, FACR
- 424 Capillary Telangiectasia**
Anne G. Osborn, MD, FACR

SECTION 6: NEOPLASMS

- 430 Neoplasms Overview**
Anne G. Osborn, MD, FACR

ASTROCYTIC TUMORS, INFILTRATING

- 434 Low-Grade Diffuse Astrocytoma**
Karen L. Salzman, MD
- 438 Anaplastic Astrocytoma**
Karen L. Salzman, MD
- 442 Glioblastoma**
Karen L. Salzman, MD
- 446 Gliosarcoma**
Karen L. Salzman, MD
- 448 Gliomatosis Cerebri**
Karen L. Salzman, MD

TABLE OF CONTENTS

ASTROCYTIC TUMORS, LOCALIZED

- 452 **Pilocytic Astrocytoma**
Karen L. Salzman, MD and Chang Yueh Ho, MD
456 **Pilomyxoid Astrocytoma**
Anne G. Osborn, MD, FACP
460 **Pleomorphic Xanthoastrocytoma**
Karen L. Salzman, MD
464 **Subependymal Giant Cell Astrocytoma**
Anne G. Osborn, MD, FACP and John H. Rees, MD

OLIGODENDROGLIAL AND MISCELLANEOUS TUMORS

- 468 **Oligodendrogioma**
Karen L. Salzman, MD
472 **Anaplastic Oligodendrogioma**
Karen L. Salzman, MD
476 **Astroblastoma**
Karen L. Salzman, MD
478 **Chordoid Glioma of the Third Ventricle**
Karen L. Salzman, MD and John H. Rees, MD
480 **Angiocentric Glioma**
Karen L. Salzman, MD and Majda M. Thurnher, MD

EPENDYMAL TUMORS

- 482 **Infratentorial Ependymoma**
Anne G. Osborn, MD, FACP and Majda M. Thurnher, MD
486 **Supratentorial Ependymoma**
Majda M. Thurnher, MD
490 **Subependymoma**
Karen L. Salzman, MD

CHOROID PLEXUS TUMORS

- 494 **Typical Choroid Plexus Papilloma**
Anne G. Osborn, MD, FACP and Chang Yueh Ho, MD
498 **Choroid Plexus Carcinoma**
Anne G. Osborn, MD, FACP and Chang Yueh Ho, MD

NEURONAL AND MIXED NEURONAL-GLIAL TUMORS

- 502 **Ganglioglioma**
Karen L. Salzman, MD
506 **Desmoplastic Infantile Astrocytoma and Ganglioglioma**
Chang Yueh Ho, MD
510 **DNET**
Karen L. Salzman, MD and Laurie A. Loevner, MD
514 **Central Neurocytoma**
Karen L. Salzman, MD
518 **Extraventricular Neurocytoma**
Karen L. Salzman, MD
520 **Cerebellar Liponeurocytoma**
Karen L. Salzman, MD and John H. Rees, MD
521 **Papillary Glioneuronal Tumor**
Karen L. Salzman, MD and John H. Rees, MD
522 **Rosette-Forming Glioneuronal Tumor**
Karen L. Salzman, MD and Majda M. Thurnher, MD

PINEAL PARENCHYMAL TUMORS

- 524 **Pineocytoma**
Karen L. Salzman, MD and Laurie A. Loevner, MD
528 **Pineal Parenchymal Tumor of Intermediate Differentiation**
Karen L. Salzman, MD and Anne G. Osborn, MD, FACP
530 **Pineoblastoma**
Anne G. Osborn, MD, FACP and Laurie A. Loevner, MD
534 **Papillary Tumor of the Pineal Region**
Karen L. Salzman, MD and John H. Rees, MD

EMBRYONAL AND NEUROBLASTIC TUMORS

- 536 **Medulloblastoma**
Anne G. Osborn, MD, FACP and Majda M. Thurnher, MD
540 **Supratentorial PNET**
Anne G. Osborn, MD, FACP and Laurie A. Loevner, MD
544 **Atypical Teratoid-Rhabdoid Tumor**
Anne G. Osborn, MD, FACP and Chang Yueh Ho, MD
548 **Metastatic Neuroblastoma**
Anne G. Osborn, MD, FACP and Chang Yueh Ho, MD

TUMORS OF CRANIAL/PERIPHERAL NERVES

- 552 **Nonvestibular Schwannoma**
Nicholas A. Koontz, MD and Anne G. Osborn, MD, FACP
556 **Neurofibroma**
Nicholas A. Koontz, MD and John H. Rees, MD

BLOOD VESSEL AND HEMOPOIETIC TUMORS

- 558 **Hemangioblastoma**
Karen L. Salzman, MD and John H. Rees, MD
562 **Hemangiopericytoma**
Karen L. Salzman, MD
566 **Primary CNS Lymphoma**
Karen L. Salzman, MD
570 **Intravascular (Angiocentric) Lymphoma**
Karen L. Salzman, MD
574 **Leukemia**
Karen L. Salzman, MD and Miral D. Jhaveri, MD

GERM CELL TUMORS

- 578 **Germinoma**
Anne G. Osborn, MD, FACP and Majda M. Thurnher, MD
582 **Teratoma**
Anne G. Osborn, MD, FACP and Majda M. Thurnher, MD
586 **Miscellaneous Malignant Germ Cell Neoplasms**
Karen L. Salzman, MD and Majda M. Thurnher, MD

METASTATIC TUMORS AND REMOTE EFFECTS OF CANCER

- 590 **Parenchymal Metastases**
Anne G. Osborn, MD, FACP
594 **Miscellaneous Intracranial Metastases**
Anne G. Osborn, MD, FACP
596 **Metastatic Intracranial Lymphoma**
Karen L. Salzman, MD
598 **Paraneoplastic Syndromes**
Karen L. Salzman, MD

TABLE OF CONTENTS

SECTION 7: PRIMARY NONNEOPLASTIC CYSTS

- 604 Primary Nonneoplastic Cysts Overview**
Anne G. Osborn, MD, FACR
- 608 Arachnoid Cyst**
Anne G. Osborn, MD, FACR
- 612 Colloid Cyst**
Anne G. Osborn, MD, FACR
- 616 Dermoid Cyst**
Chang Yueh Ho, MD
- 620 Epidermoid Cyst**
Anne G. Osborn, MD, FACR and Gregory L. Katzman, MD, MBA
- 624 Neuroglial Cyst**
Anne G. Osborn, MD, FACR
- 626 Periventricular Cyst**
Anne G. Osborn, MD, FACR and Susan I. Blaser, MD, FRCPC
- 630 Choroid Fissure Cyst**
Chang Yueh Ho, MD
- 631 Hippocampal Sulcus Remnant Cysts**
Chang Yueh Ho, MD
- 632 Enlarged Perivascular Spaces**
Anne G. Osborn, MD, FACR
- 636 Pineal Cyst**
Anne G. Osborn, MD, FACR
- 640 Choroid Plexus Cyst**
Anne G. Osborn, MD, FACR
- 644 Ependymal Cyst**
Anne G. Osborn, MD, FACR
- 646 Porencephalic Cyst**
Anne G. Osborn, MD, FACR and Gregory L. Katzman, MD, MBA
- 650 Neurenteric Cyst**
Anne G. Osborn, MD, FACR
- 652 Nonneoplastic Tumor-Associated Cysts**
Anne G. Osborn, MD, FACR

SECTION 8: INFECTIOUS, INFLAMMATORY, AND DEMYELINATING DISEASE

- 656 CNS Infectious Disease Overview**
Miral D. Jhaveri, MD and Anne G. Osborn, MD, FACR

CONGENITAL/NEONATAL INFECTIONS

- 658 TORCH Infections, Overview**
Gary L. Hedlund, DO
- 662 Congenital CMV**
Miral D. Jhaveri, MD and Gary L. Hedlund, DO
- 666 Congenital HIV**
Miral D. Jhaveri, MD and Gary L. Hedlund, DO
- 668 Neonatal Herpes Encephalitis**
Miral D. Jhaveri, MD and Gary L. Hedlund, DO

ACQUIRED INFECTIONS

- 670 Group B Streptococcal Meningitis**
Gary L. Hedlund, DO

- 674 Citrobacter Meningitis**
Gary L. Hedlund, DO
- 678 Meningitis**
Miral D. Jhaveri, MD and Karen L. Salzman, MD
- 682 Abscess**
Miral D. Jhaveri, MD and Karen L. Salzman, MD
- 686 Ventriculitis**
Miral D. Jhaveri, MD and Karen L. Salzman, MD
- 688 Empyema**
Miral D. Jhaveri, MD and Karen L. Salzman, MD
- 692 Herpes Encephalitis**
Miral D. Jhaveri, MD and Karen L. Salzman, MD
- 696 Miscellaneous Encephalitis**
Miral D. Jhaveri, MD and Karen L. Salzman, MD
- 700 West Nile Virus Encephalitis**
Miral D. Jhaveri, MD and Laurie A. Loevner, MD
- 702 HHV-6 Encephalitis**
Miral D. Jhaveri, MD
- 704 Cerebellitis**
Miral D. Jhaveri, MD
- 706 Rasmussen Encephalitis**
Miral D. Jhaveri, MD and Gary L. Hedlund, DO
- 710 Subacute Sclerosing Panencephalitis**
Gary L. Hedlund, DO
- 712 Tuberculosis**
Miral D. Jhaveri, MD and Sheri L. Harder, MD, FRCPC
- 716 Neurocysticercosis**
Miral D. Jhaveri, MD and Karen L. Salzman, MD
- 720 Hydatid Disease**
Miral D. Jhaveri, MD
- 722 Amebic Disease**
Miral D. Jhaveri, MD
- 724 Cerebral Malaria**
Anne G. Osborn, MD, FACR
- 726 Miscellaneous Parasites**
Miral D. Jhaveri, MD and Karen L. Salzman, MD
- 730 Fungal Diseases**
Miral D. Jhaveri, MD and Laurie A. Loevner, MD
- 734 Rickettsial Diseases**
Miral D. Jhaveri, MD and Laurie A. Loevner, MD
- 736 Lyme Disease**
Miral D. Jhaveri, MD and Laurie A. Loevner, MD
- 738 Acquired HIV Encephalitis**
Miral D. Jhaveri, MD and James M. Provenzale, MD
- 742 Acquired Toxoplasmosis**
Miral D. Jhaveri, MD and James M. Provenzale, MD
- 744 Acquired CMV**
Miral D. Jhaveri, MD and Yoshimi Anzai, MD, MPH
- 746 Cryptococcosis**
Yoshimi Anzai, MD, MPH
- 748 Progressive Multifocal Leukoencephalopathy (PML)**
Miral D. Jhaveri, MD and Yoshimi Anzai, MD, MPH
- 750 Immune Reconstitution Inflammatory Syndrome (IRIS)**
Miral D. Jhaveri, MD
- 752 HIV/AIDS, Miscellaneous Manifestations**
Miral D. Jhaveri, MD

TABLE OF CONTENTS

INFLAMMATORY AND DEMYELINATING DISEASE

- 756 **Multiple Sclerosis**
Miral D. Jhaveri, MD
- 760 **Neuromyelitis Optica**
Miral D. Jhaveri, MD
- 764 **ADEM**
Miral D. Jhaveri, MD and Jeffrey S. Anderson, MD, PhD
- 768 **AHLE**
Anne G. Osborn, MD, FACP
- 770 **CLIPPERS**
Anne G. Osborn, MD, FACP

SECTION 9: INHERITED METABOLIC/DEGENERATIVE DISORDERS

- 774 **Inherited Metabolic Disorders Overview**
A. James Barkovich, MD

NORMAL VARIANTS

- 778 **Hypomyelination**
Blaise V. Jones, MD

MITOCHONDRIAL DISORDERS

- 782 **Leigh Syndrome**
A. James Barkovich, MD
- 786 **MELAS**
Susan I. Blaser, MD, FRCPC
- 790 **Kearns-Sayre Syndrome**
Susan I. Blaser, MD, FRCPC

LYSOSOMAL DISORDERS

- 792 **Mucopolysaccharidoses**
Susan I. Blaser, MD, FRCPC
- 796 **Gangliosidosis (GM2)**
Anna Illner, MD
- 800 **Metachromatic Leukodystrophy (MLD)**
Anna Illner, MD and Anne G. Osborn, MD, FACP
- 804 **Krabbe**
Blaise V. Jones, MD
- 808 **Fabry Disease**
Miral D. Jhaveri, MD and Anne G. Osborn, MD, FACP

PEROXISOMAL DISORDERS

- 810 **Zellweger Syndrome Spectrum**
P. Ellen Grant, MD
- 812 **X-Linked Adrenoleukodystrophy**
Susan I. Blaser, MD, FRCPC and Anne G. Osborn, MD, FACP
- 816 **Other Peroxisomal Disorders**
Susan I. Blaser, MD, FRCPC

ORGANIC AND AMINOACIDOPATHIES

- 820 **Maple Syrup Urine Disease**
Susan I. Blaser, MD, FRCPC
- 824 **Urea Cycle Disorders**
P. Ellen Grant, MD
- 826 **Glutaric Aciduria Type 1**
Susan I. Blaser, MD, FRCPC
- 830 **Canavan Disease**
P. Ellen Grant, MD
- 832 **Alexander Disease**
Anna Illner, MD
- 836 **Miscellaneous Organic/Aminoacidopathies**
Anna Illner, MD and Anne G. Osborn, MD, FACP

MISCELLANEOUS

- 838 **Megalencephaly With Leukoencephalopathy and Cysts (MLC)**
Susan I. Blaser, MD, FRCPC
- 842 **Neurodegeneration With Brain Iron Accumulation (NBIA)**
Chang Yueh Ho, MD and Anne G. Osborn, MD, FACP
- 844 **PKAN**
Anna Illner, MD
- 848 **Huntington Disease**
James M. Provenzale, MD
- 852 **Wilson Disease**
Anne G. Osborn, MD, FACP and James M. Provenzale, MD

SECTION 10: ACQUIRED TOXIC/METABOLIC/DEGENERATIVE DISORDERS

- 858 **Acquired Toxic/Metabolic Disorders Overview**
Miral D. Jhaveri, MD and Karen L. Salzman, MD

TOXIC, METABOLIC, NUTRITIONAL, SYSTEMIC DISEASES WITH CNS MANIFESTATIONS

- 862 **Pediatric Hypoglycemia**
Miral D. Jhaveri, MD and P. Ellen Grant, MD
- 866 **Adult Hypoglycemia**
Miral D. Jhaveri, MD and John H. Rees, MD
- 868 **Kernicterus**
Miral D. Jhaveri, MD and P. Ellen Grant, MD
- 870 **Thyroid Disorders**
Miral D. Jhaveri, MD
- 874 **Parathyroid Disorders**
Miral D. Jhaveri, MD
- 876 **Fahr Disease**
Miral D. Jhaveri, MD and Gregory L. Katzman, MD, MBA
- 880 **Alcoholic Encephalopathy**
Miral D. Jhaveri, MD
- 884 **Hepatic Encephalopathy**
Miral D. Jhaveri, MD
- 888 **Acute Hypertensive Encephalopathy, PRES**
Miral D. Jhaveri, MD and Anne G. Osborn, MD, FACP
- 892 **Chronic Hypertensive Encephalopathy**
Miral D. Jhaveri, MD and James M. Provenzale, MD
- 896 **Idiopathic Intracranial Hypertension**
Miral D. Jhaveri, MD
- 900 **Carbon Monoxide Poisoning**
Yoshimi Anzai, MD, MPH
- 904 **Drug Abuse**
Miral D. Jhaveri, MD

TABLE OF CONTENTS

908	Methanol Poisoning <i>Sheri L. Harder, MD, FRCPC</i>
910	Cyanide Poisoning <i>Miral D. Jhaveri, MD and Sheri L. Harder, MD, FRCPC</i>
912	Osmotic Demyelination Syndrome <i>Miral D. Jhaveri, MD and Sheri L. Harder, MD, FRCPC</i>
916	Radiation and Chemotherapy <i>Miral D. Jhaveri, MD and Karen L. Salzman, MD</i>
920	Pseudoprogression <i>Karen L. Salzman, MD</i>
922	Pseudoresponse <i>Karen L. Salzman, MD</i>
924	Mesial Temporal Sclerosis <i>Miral D. Jhaveri, MD and Kevin R. Moore, MD</i>
928	Status Epilepticus <i>Miral D. Jhaveri, MD and Karen L. Salzman, MD</i>
932	Transient Global Amnesia (TGA) <i>Anne G. Osborn, MD, FACR</i>

DEMENTIAS AND DEGENERATIVE DISORDERS

934	Normal Aging Brain <i>Miral D. Jhaveri, MD and Sheri L. Harder, MD, FRCPC</i>
938	Alzheimer Disease <i>Miral D. Jhaveri, MD and James M. Provenzale, MD</i>
942	Vascular Dementia <i>Miral D. Jhaveri, MD and James M. Provenzale, MD</i>
946	Frontotemporal Lobar Degeneration <i>Miral D. Jhaveri, MD and James M. Provenzale, MD</i>
950	Dementia With Lewy Bodies <i>Miral D. Jhaveri, MD and James M. Provenzale, MD</i>
952	Creutzfeldt-Jakob Disease (CJD) <i>Miral D. Jhaveri, MD and Karen L. Salzman, MD</i>
956	Parkinson Disease <i>Miral D. Jhaveri, MD and James M. Provenzale, MD</i>
960	Multiple System Atrophy <i>Miral D. Jhaveri, MD</i>
964	Corticobasal Degeneration <i>Miral D. Jhaveri, MD and James M. Provenzale, MD</i>
968	Progressive Supranuclear Palsy <i>Miral D. Jhaveri, MD and James M. Provenzale, MD</i>
972	Amyotrophic Lateral Sclerosis (ALS) <i>Miral D. Jhaveri, MD and Lubdha M. Shah, MD</i>
976	Wallerian Degeneration <i>Miral D. Jhaveri, MD and Lubdha M. Shah, MD</i>
980	Crossed Cerebellar Diaschisis <i>Miral D. Jhaveri, MD and Anne G. Osborn, MD, FACR</i>
982	Hypertrophic Olivary Degeneration <i>Miral D. Jhaveri, MD and Anne G. Osborn, MD, FACR</i>

Part II: Anatomy-Based Diagnoses

SECTION 1: VENTRICLES AND CISTERNS

988	Ventricles and Cisterns Overview <i>Miral D. Jhaveri, MD</i>
-----	--

NORMAL VARIANTS

994	Cavum Septi Pellucidi (CSP) <i>Miral D. Jhaveri, MD and Anne G. Osborn, MD, FACR</i>
995	Cavum Velum Interpositum (CVI) <i>Miral D. Jhaveri, MD and Anne G. Osborn, MD, FACR</i>
996	Enlarged Subarachnoid Spaces <i>Miral D. Jhaveri, MD and Chang Yueh Ho, MD</i>

HYDROCEPHALUS

1000	Intraventricular Obstructive Hydrocephalus <i>Miral D. Jhaveri, MD</i>
1004	Extraventricular Obstructive Hydrocephalus <i>Miral D. Jhaveri, MD</i>
1006	Aqueductal Stenosis <i>Miral D. Jhaveri, MD and Kevin R. Moore, MD</i>
1010	Normal Pressure Hydrocephalus <i>Miral D. Jhaveri, MD</i>
1014	CSF Shunts and Complications <i>Miral D. Jhaveri, MD and Kevin R. Moore, MD</i>

SECTION 2: SELLA AND PITUITARY

1020	Sella and Pituitary Overview <i>Karen L. Salzman, MD and Anne G. Osborn, MD, FACR</i>
	CONGENITAL
1024	Pituitary Anomalies <i>Karen L. Salzman, MD and Kevin R. Moore, MD</i>
1028	Tuber Cinereum Hamartoma <i>Karen L. Salzman, MD and Kevin R. Moore, MD</i>
1032	Rathke Cleft Cyst <i>Karen L. Salzman, MD and Anne G. Osborn, MD, FACR</i>

NEOPLASMS

1036	Pituitary Microadenoma <i>Karen L. Salzman, MD and Anne G. Osborn, MD, FACR</i>
1040	Pituitary Macroadenoma <i>Karen L. Salzman, MD and Anne G. Osborn, MD, FACR</i>
1044	Pituitary Apoplexy <i>Karen L. Salzman, MD and Anne G. Osborn, MD, FACR</i>
1048	Craniopharyngioma <i>Karen L. Salzman, MD and John H. Rees, MD</i>
1052	Pituicytoma <i>Karen L. Salzman, MD</i>
1054	Spindle Cell Oncocytoma <i>Anne G. Osborn, MD, FACR and Karen L. Salzman, MD</i>
1055	Granular Cell Tumor <i>Karen L. Salzman, MD</i>

MISCELLANEOUS

1056	Empty Sella <i>Luke N. Ledbetter, MD and Anne G. Osborn, MD, FACR</i>
1060	Pituitary Hyperplasia <i>Luke N. Ledbetter, MD and Anne G. Osborn, MD, FACR</i>
1062	Lymphocytic Hypophysitis <i>Karen L. Salzman, MD</i>

TABLE OF CONTENTS

SECTION 3: CPA-IAC

- 1066 CPA-IAC Overview
H. Ric Harnsberger, MD

CONGENITAL

- 1070 Lipoma, CPA-IAC
H. Ric Harnsberger, MD
- 1074 Epidermoid Cyst, CPA-IAC
H. Ric Harnsberger, MD
- 1078 Arachnoid Cyst, CPA-IAC
H. Ric Harnsberger, MD

INFLAMMATORY

- 1082 Bell Palsy
H. Ric Harnsberger, MD

VASCULAR

- 1086 Trigeminal Neuralgia
H. Ric Harnsberger, MD
- 1088 Hemifacial Spasm
H. Ric Harnsberger, MD

NEOPLASMS

- 1090 Vestibular Schwannoma
H. Ric Harnsberger, MD
- 1094 Meningioma, CPA-IAC
H. Ric Harnsberger, MD
- 1098 Metastases, CPA-IAC
H. Ric Harnsberger, MD

SECTION 4: SKULL, SCALP, AND MENINGES

- 1104 Skull, Scalp, & Meninges Overview
Karen L. Salzman, MD

CONGENITAL

- 1108 Congenital Calvarial Defects
Kevin R. Moore, MD
- 1112 Craniostenoses
Kevin R. Moore, MD
- 1116 Cephalocele
Kevin R. Moore, MD
- 1122 Atretic Cephalocele
Anne G. Osborn, MD, FACP and Kevin R. Moore, MD

TRAUMA

- 1126 Leptomeningeal Cyst ("Growing Fracture")
Anne G. Osborn, MD, FACP and Kevin R. Moore, MD
- 1128 Intracranial Hypotension
Anne G. Osborn, MD, FACP

NONNEOPLASTIC AND TUMOR-LIKE DISORDERS

- 1132 Intracranial Idiopathic Inflammatory Pseudotumor
H. Ric Harnsberger, MD
- 1136 IgG4-Related Disease
Anne G. Osborn, MD, FACP

1138 Fibrous Dysplasia

Anne G. Osborn, MD, FACP and Miral D. Jhaveri, MD

1142 Paget Disease

Anne G. Osborn, MD, FACP and Miral D. Jhaveri, MD

1146 Extramedullary Hematopoiesis

Anne G. Osborn, MD, FACP and Charles Raybaud, MD, FRCPC

1150 Thick Skull

Anne G. Osborn, MD, FACP and Miral D. Jhaveri, MD

1152 Langerhans Cell Histiocytosis, Skull and Brain

Anne G. Osborn, MD, FACP and Gary L. Hedlund, DO

1156 Neurosarcoma

Anne G. Osborn, MD, FACP and Gregory L. Katzman, MD, MBA

1160 Miscellaneous Histiocytoses

Anne G. Osborn, MD, FACP and Karen L. Salzman, MD

1164 Sebaceous Cyst

Anne G. Osborn, MD, FACP

NEOPLASMS

1166 Meningioma

Anne G. Osborn, MD, FACP and Majda M. Thurnher, MD

1172 Atypical and Malignant Meningioma

Anne G. Osborn, MD, FACP and Majda M. Thurnher, MD

1176 Miscellaneous Benign Mesenchymal Tumors

Anne G. Osborn, MD, FACP and Gregory L. Katzman, MD, MBA

1180 Miscellaneous Malignant Mesenchymal Tumors

Anne G. Osborn, MD, FACP and Gregory L. Katzman, MD, MBA

1184 Calvarial Hemangioma

Anne G. Osborn, MD, FACP and Gregory L. Katzman, MD, MBA

1188 Dura/Venous Sinuses Hemangioma

Anne G. Osborn, MD, FACP and Gregory L. Katzman, MD, MBA

1190 Myeloma

Anne G. Osborn, MD, FACP and Miral D. Jhaveri, MD

1194 Skull and Meningeal Metastases

Anne G. Osborn, MD, FACP and Miral D. Jhaveri, MD