

Subject Index

- ABI, *see* Ankle-brachial index
- ACA, *see* Anterior cerebral artery
- AChA, *see* Anterior choroidal artery
- ACoA, *see* Anterior communicating artery
- Aging, intracranial atherosclerosis risk factor 48
- AICA, *see* Anterior inferior cerebellar artery
- Angioplasty
- historical perspective 153, 154
 - multifocal stenoses 155, 156
 - patient selection 156
 - technical aspects 154, 155
- Ankle-brachial index (ABI), atherosclerosis marker 101
- Anterior cerebral artery (ACA)
- anatomy 10, 11
 - dissection 182
 - stroke mechanism 67
 - stroke syndromes
 - atherosclerosis significance in infarction 76–78
 - general clinical syndromes 76
 - transcranial Doppler ultrasound
 - examination technique 130
 - stenosis diagnosis 132, 133
- Anterior choroidal artery (AChA)
- anatomy 6–8
 - stroke syndromes 78–80
- Anterior communicating artery (ACoA), anatomy 6, 10, 15
- Anterior inferior cerebellar artery (AICA)
- anatomy 13, 14
 - stroke syndromes
 - atherosclerosis significance in cerebellar infarction 87
 - cerebellar infarction syndromes 86, 87
- Antiplatelet agents, *see specific drugs*
- Arterial wall, anatomy 3–5
- Asians, intracranial atherosclerosis epidemiology
- asymptomatic disease
 - community-based populations 35–38
 - high-risk patients 38, 39
 - autopsy studies 35
 - databases 43
 - imaging studies 39, 40
 - risk factors 52, 53
- Aspirin
- mechanism of action 142
 - monotherapy for stroke prevention 142–144
- Asymptomatic intracranial atherosclerosis
- biomarkers 102, 103
 - prevalence 94, 95
 - prognosis 95, 96
- Basilar artery, *see also* Pontine infarction syndromes
- anatomy 13, 14
 - atherosclerosis sites 23
 - dissection 183
 - lesion features 26
 - stroke mechanism 67, 68
 - top of the basilar artery syndrome 87, 88
 - transcranial Doppler ultrasound
 - examination technique 130, 131
 - stenosis diagnosis 132, 133
- BOD, *see* Branch occlusive disease
- Branch occlusive disease (BOD)
- risk factors 51
 - stroke mechanism 60–62
- Calcification, intracranial arteries 101
- CAPRIE trial 144
- CARDASIL, *see* Cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy

- CARESS trial 148
- Cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy (CARDASIL), cerebral artery involvement 195, 196
- Cilostazol
intracranial atherosclerosis studies 147, 148
mechanism of action 142
monotherapy for stroke prevention 144
- Circle of Willis
anatomy 6, 7
development 3
plaque morphology 24, 25
- Clopidogrel
combination therapy 145, 146, 149
mechanism of action 142
monotherapy for stroke prevention 144
- Computed tomography angiography (CTA)
historical perspective 2
overview 109–111
- C-reactive protein (CRP), inflammation
biomarker 103, 104
- CRP, *see* C-reactive protein
- CTA, *see* Computed tomography angiography
- Cysticercosis, cerebral artery involvement 188
- DECIMAL study 173, 174
- Decompressive craniectomy, middle cerebral artery infarction 171–174
- DESTINY trials 173, 174
- Diabetes, intracranial atherosclerosis risk factor 48, 52, 101
- Digital subtraction angiography (DSA)
historical perspective 2
overview 110
- Dipyridamole
mechanism of action 142
monotherapy for stroke prevention 144
- Dolichoectasia, clinical features 184, 185
- DSA, *see* Digital subtraction angiography
- Dyslipidemia, intracranial atherosclerosis risk factor 48, 50, 52, 101
- Embryology, central nervous system arteries 3
- Endothelial dysfunction, intracranial atherosclerosis risk factor 51
- Ethnicity, epidemiology of intracranial atherosclerosis 34–43
- Europe, intracranial atherosclerosis epidemiology 40
- Extracranial-intracranial bypass, *see* Revascularization surgery
- FABP2, polymorphisms and intracranial atherosclerosis 51
- Fibromuscular dysplasia (FMD), clinical features 184
- FMD, *see* Fibromuscular dysplasia
- Fungal infection, cerebral artery involvement 189
- Haemophilus influenzae*, cerebral artery involvement 185
- Hamlet study 173, 174
- HeADDFIRST 173, 174
- Heparin, *see* Low-molecular-weight heparin
- Herpes zoster, cerebral artery involvement 186
- High resolution magnetic resonance imaging (HR-MRI)
historical perspective 2
intracranial artery imaging
atherosclerosis 113, 114
dissection 115, 118
vasculitis 118, 119
vessel wall change imaging 27–30, 53, 54
Moyamoya disease 116–118, 211
techniques 112, 113
- HIV, *see* Human immunodeficiency virus
- HR-MRI, *see* High resolution magnetic resonance imaging
- Human immunodeficiency virus (HIV), cerebral artery involvement 186–188
- Hypertension, intracranial atherosclerosis risk factor 48, 52, 101
- ICA, *see* Internal carotid artery
- Inferolateral (thalamogeniculate) arteries, infarction 85
- Inflammation
biomarkers 103, 104
intracranial atherosclerosis risk factor 50, 51, 102
- Innervation, arteries 4
- Internal carotid artery (ICA)
anatomy 5–7
atherosclerosis sites 22
lesion features 26
stroke syndromes 78
transcranial Doppler ultrasound
examination technique 130, 131
stenosis diagnosis 130–133
- Isolated central nervous system angiitis 192

- Kawasaki disease (KD), cerebral artery involvement 190
 KD, *see* Kawasaki disease
- Lateral medullary infarction syndrome 80
 Leptospirosis, cerebral artery involvement 189
 Lipoprotein-associated phospholipase A2 (Lp-PLA2), inflammation biomarker 103, 104
 LMWH, *see* Low-molecular-weight heparin
 Low-molecular-weight heparin (LMWH) 147
 Lp-PLA2, *see* Lipoprotein-associated phospholipase A2
 Lumen, architecture 4
- Magnetic resonance angiography (MRA)
 epidemiology of intracranial atherosclerosis in
 Asian populations 39, 40
 historical perspective 2
 internal carotid artery 5
 overview 109, 111, 112
 stroke mechanism imaging 59
 Magnetic resonance imaging, *see* High resolution magnetic resonance imaging; Magnetic resonance angiography
 MATCH trial 148
 MCA, *see* Middle cerebral artery
 Medial medullary infarction syndrome 80, 81
 Meningitis, cerebral artery involvement 185
 Metabolic syndrome, intracranial atherosclerosis risk factor 50, 52, 53, 102
 Microembolic signals, *see* Transcranial Doppler ultrasound
 Middle cerebral artery (MCA)
 anatomy 5, 8–10
 atherosclerosis sites 22, 23
 decompressive craniectomy for massive infarction 171–174
 dissection clinical features 180, 182
 lesion features 26
 stroke mechanism 66, 67
 stroke syndromes
 atherosclerosis significance in infarction 73–75
 general clinical syndromes 73
 subcortical infarction associated with atherosclerosis 75, 76
 transcranial Doppler ultrasound
 examination technique 129, 130
 stenosis diagnosis 132, 133
 MMD, *see* Moyamoya disease
- Moyamoya disease (MMD)
 biomarkers
 cytokines 209
 endothelial progenitor cells 208, 209
 clinical features 209, 210
 comorbid conditions 207, 208
 diagnosis 211
 environmental factors 207
 epidemiology 205, 206
 genetics 207
 high resolution magnetic resonance imaging 116–118, 211
 overview 204, 205
 pathology 206
 prognosis 215, 216
 revascularization surgery
 complications 213–215
 indications 212
 overview 211, 212
 techniques 212, 213
 MRA, *see* Magnetic resonance angiography
- North America, intracranial atherosclerosis epidemiology
 autopsy studies 40, 41
 Chicago study 41
 imaging studies 41
 race differences 40–42
 sex differences 40, 41
- OA, *see* Ophthalmic artery
 Ophthalmic artery (OA), transcranial Doppler ultrasound
 examination technique 130
 stenosis diagnosis 132, 133
- PAI-1, *see* Plasminogen activator inhibitor-1
 PAN, *see* Polyarteritis nodosa
 Paramedian arteries, infarction 85
 PCA, *see* Posterior cerebral artery
 PCoA, *see* Posterior communicating artery
 PDE4D, polymorphisms and intracranial atherosclerosis 53
 PICA, *see* Posterior inferior cerebellar artery
 Plaque activity
 evidence
 direct evidence and hemodynamic factors 100
 indirect evidence
 cortical microinfarcts 99
 microembolic signals 100

- old infarct in territory of symptomatic stenosis 99
 - stenosis progression 100
 - symptomatic versus asymptomatic intracranial stenosis 99
- overview 99
- Plaque morphology
 - circle of Willis 24, 25
 - stenosis
 - location 99
 - severity 98
 - vulnerable plaques 99
- Plasminogen activator inhibitor-1 (PAI-1), intracranial atherosclerosis progression biomarker 104, 105
- Polyarteritis nodosa (PAN), cerebral artery involvement 193
- Pontine infarction syndromes
 - basilar artery atherosclerosis significance 83, 84
 - bilateral infarction syndrome 82, 83
 - epidemiology 82
 - motor dysfunction 82
 - ocular motor dysfunction 82
- Posterior cerebral artery (PCA)
 - anatomy 15, 16
 - dissection 183
 - stroke mechanism 68
 - stroke syndromes
 - atherosclerosis significance in infarction 86
 - cortical infarction 86
 - midbrain infarction 84
 - thalamic infarction 84–86
 - transcranial Doppler ultrasound
 - examination technique 130
 - stenosis diagnosis 132, 133
- Posterior choroidal arteries, infarction 85, 86
- Posterior communicating artery (PCoA), anatomy 6, 7, 15, 16
- Posterior inferior cerebellar artery (PICA)
 - anatomy 12–14
 - dissection 183, 184
 - stroke syndromes
 - atherosclerosis significance in cerebellar infarction 87
 - cerebellar infarction syndromes 86, 87
- Prasugrel, mechanism of action 142
- Prognosis
 - asymptomatic intracranial atherosclerosis 95, 96
 - symptomatic intracranial atherosclerosis 97, 98
- Radiation injury, cerebral arteries 194
- RCVS, *see* Reversible cerebral vasoconstriction syndrome
- Revascularization surgery
 - extracranial-intracranial bypass historical perspective 166–168
 - hemodynamic impairment and subsequent stroke risk 168, 169
 - indications 169, 170
 - Moyamoya disease
 - complications 213–215
 - indications 212
 - overview 211, 212
 - techniques 212, 213
 - posterior circulation ischemia patients 170, 171
 - techniques 164–166
- Reversible cerebral vasoconstriction syndrome (RCVS)
 - overview 190
 - stroke in patients with vasoconstriction 190–192
- Risk factors, *see specific risk factors*
- RNF213*, polymorphisms and intracranial atherosclerosis 53, 207
- SAMMPRIS trial 94, 97, 99, 101–104, 148, 157–161
- Sarcoidosis, cerebral artery involvement 194
- SCA, *see* Superior cerebellar artery
- Sex differences, intracranial atherosclerosis
 - epidemiology 40, 41, 48, 101, 102
- SLE, *see* Systemic lupus erythematosus
- Sleep apnea, intracranial atherosclerosis risk factor 51
- Small vessel disease, coexistence in intracranial atherosclerosis patients 101
- Smoking, intracranial atherosclerosis risk factor 50, 52
- Stenting
 - complications 156, 157
 - historical perspective 153, 154
 - intracranial atherosclerosis patients, arguments for and against 157–161
 - multifocal stenoses 155, 156
 - patient selection 156
 - SAMMPRIS trial 94, 97, 99, 101–104, 148, 157–161
 - technical aspects 154, 155
- Streptococcus pneumoniae*, cerebral artery involvement 185
- Stroke mechanisms
 - anterior cerebral artery 67

- artery to artery embolism 60
- basilar artery 67, 68
- branch occlusive disease 60–62
- hypoperfusion 62–65
- imaging 59
- in situ thrombotic occlusion 60
- middle cerebral artery 66, 67
- overview 59
- posterior cerebral artery 68
- vertebral artery 67
- Substance abuse, cerebral artery involvement 193, 194
- Superior cerebellar artery (SCA)
 - anatomy 13, 14
 - stroke syndromes
 - atherosclerosis significance in cerebellar infarction 87
 - cerebellar infarction syndromes 86, 87
- Surgery, *see* Decompressive craniectomy; Revascularization surgery
- Symptomatic intracranial atherosclerosis
 - biomarkers
 - angiogenesis inhibition 105
 - inflammation 103, 104
 - prothrombotic state and impaired fibrinolysis 104, 105
 - prognosis 97, 98
- Syphilis, cerebral artery involvement 188, 189
- Systemic lupus erythematosus (SLE), cerebral artery involvement 192, 193

- Takayasu's arteritis, cerebral artery involvement 195
- TAO, *see* Thromboangiitis obliterans
- TCD, *see* Transcranial Doppler ultrasound
- Thromboangiitis obliterans (TAO), cerebral artery involvement 194, 195
- Ticagrelor, mechanism of action 142
- Top of the basilar artery syndrome 87, 88
- Tortuosity, intracranial atherosclerosis risk factor 53
- TOSS studies 148
- Transcranial Doppler ultrasound (TCD)
 - historical perspective 2
 - microembolic signals
 - clinical significance 136
 - detection 100, 134, 135
 - monitoring during interventions 136
 - modes
 - continuous wave 126
 - pulse wave 126
 - transcranial power motion mode 126
 - overview 124, 125
 - principles
 - Doppler effect 125, 126
 - hemodynamics
 - flow resistance 127
 - flow velocity 128
 - turbulent flow 128, 129
 - ultrasound 125
 - stenosis diagnosis
 - anterior cerebral artery 132, 133
 - middle cerebral artery 132, 133
 - other arteries 132, 133
 - stroke mechanism imaging 59
 - stroke therapy 137
 - techniques for specific arteries
 - anterior cerebral artery 130
 - basilar artery 130, 131
 - internal carotid artery 130, 131
 - middle cerebral artery 129, 130
 - ophthalmic artery 130
 - posterior cerebral artery 130
 - vertebral artery 130
 - transcranial color-coded duplex sonography 126, 127
- Tuberculosis, cerebral artery involvement 186
- Tuberothalamic artery, infarction 85

- Ultrasound, *see* Transcranial Doppler ultrasound

- Vertebral artery
 - anatomy 11, 12
 - dissection 182, 183
 - lesion features 26
 - stroke mechanism 67
 - stroke syndromes
 - atherosclerosis significance in medullary syndromes 81, 82
 - lateral medullary infarction syndrome 80
 - medial medullary infarction syndrome 80, 81
 - transcranial Doppler ultrasound
 - examination technique 130, 131
 - stenosis diagnosis 132, 133

- Warfarin, intracranial atherosclerosis studies 146, 148
- WASID study 42, 96–102, 110, 146, 152, 158, 168
- Watanabe heritable hyperlipidemic (WHHL)
 - rabbit 28, 30
- WHHL rabbit, *see* Watanabe heritable hyperlipidemic rabbit