

# mechanical embolus removal for cerebral ischemia

**mechanical embolus removal for cerebral ischemia** is a critical intervention in the management of acute ischemic stroke caused by an embolic obstruction in cerebral arteries. This advanced endovascular procedure aims to restore blood flow by physically extracting the embolus, thereby minimizing brain tissue damage and improving clinical outcomes. With cerebral ischemia being a leading cause of disability and death worldwide, timely and effective treatment options like mechanical embolus removal have gained prominence. This article explores the indications, techniques, benefits, risks, and future directions of mechanical embolus removal for cerebral ischemia. It also discusses patient selection criteria, procedural steps, and post-procedural care to provide a comprehensive understanding of this lifesaving treatment. The following sections will thoroughly examine these aspects to highlight how mechanical thrombectomy has revolutionized stroke management.

- Overview of Cerebral Ischemia and Embolic Stroke
- Indications for Mechanical Embolus Removal
- Techniques and Devices Used in Mechanical Embolus Removal
- Procedure and Clinical Workflow
- Outcomes and Benefits of Mechanical Embolus Removal
- Risks and Complications
- Post-Procedure Care and Rehabilitation
- Future Directions and Innovations

## Overview of Cerebral Ischemia and Embolic Stroke

Cerebral ischemia occurs when blood flow to a part of the brain is reduced or interrupted, leading to insufficient oxygen and nutrient delivery to brain tissue. An embolic stroke specifically results from a clot or other embolus traveling from a distant site, such as the heart or large arteries, and lodging within a cerebral artery. This occlusion disrupts cerebral perfusion, causing ischemic injury. Prompt restoration of blood flow is essential to salvage viable brain tissue and minimize neurological deficits. Mechanical embolus removal for cerebral ischemia targets the physical extraction of the

obstructing embolus to reestablish perfusion rapidly.

## **Pathophysiology of Embolic Stroke**

Embolic stroke typically originates from cardiac sources like atrial fibrillation or valvular disease, or from atherosclerotic plaques in the carotid arteries. Emboli travel through the bloodstream and occlude smaller cerebral vessels, most commonly the middle cerebral artery. The resulting ischemia can lead to infarction if untreated. Understanding the pathophysiology guides therapeutic strategies such as mechanical thrombectomy to directly remove the embolus.

## **Clinical Presentation**

Patients with embolic cerebral ischemia often present with sudden-onset neurological deficits including unilateral weakness, speech disturbances, visual field deficits, or altered consciousness. Rapid identification and diagnosis using neuroimaging modalities like CT angiography or MRI are critical for successful intervention.

## **Indications for Mechanical Embolus Removal**

Mechanical embolus removal for cerebral ischemia is indicated primarily in patients with acute ischemic stroke due to large vessel occlusion (LVO) who meet specific clinical criteria. These criteria ensure that the procedure is both safe and likely to provide meaningful neurological recovery.

## **Patient Selection Criteria**

Ideal candidates typically have:

- Confirmed large vessel occlusion in anterior circulation (e.g., internal carotid artery or middle cerebral artery)
- Presentation within a therapeutic time window, often up to 24 hours from symptom onset, depending on imaging and clinical factors
- Moderate to severe neurological deficits as measured by scales such as the NIH Stroke Scale (NIHSS)
- Absence of extensive established infarction on imaging
- No contraindications to endovascular intervention

## **Contraindications**

Contraindications may include:

- Severe comorbidities precluding intervention
- Coagulopathies or bleeding disorders
- Large established infarct core indicating irreversible brain damage

## **Techniques and Devices Used in Mechanical Embolus Removal**

Mechanical embolus removal for cerebral ischemia involves specialized endovascular devices designed to capture and extract emboli obstructing cerebral vessels. Multiple techniques and devices have been developed to optimize recanalization rates and safety.

### **Stent Retrievers**

Stent retrievers are among the most commonly used devices. These self-expanding mesh-like stents are deployed across the occlusion to ensnare the embolus. The device and clot are then withdrawn together, restoring vessel patency. Stent retrievers offer high rates of successful reperfusion and are widely supported by clinical evidence.

### **Aspiration Catheters**

Aspiration techniques use large-bore catheters to directly suction the embolus from the vessel. This method can be used alone or in combination with stent retrievers. Aspiration may reduce procedure time and the risk of distal embolization.

### **Combined Approaches**

Some interventions combine stent retrievers with aspiration to maximize clot retrieval efficacy. The choice of technique depends on clot characteristics, vascular anatomy, and operator preference.

# **Procedure and Clinical Workflow**

The mechanical embolus removal procedure requires a coordinated multidisciplinary team and a streamlined workflow to minimize time to reperfusion, which is critical for patient outcomes.

## **Pre-Procedure Evaluation**

Patients undergo rapid neurological assessment and imaging to confirm diagnosis and eligibility. Intravenous thrombolysis may be administered if within the standard window and no contraindications exist.

## **Endovascular Procedure**

The procedure is performed under conscious sedation or general anesthesia. Vascular access is typically gained via the femoral artery. Under fluoroscopic guidance, catheters are navigated to the site of occlusion. The chosen device is deployed to capture and remove the embolus, with progress monitored through angiography.

## **Post-Procedure Monitoring**

Following successful recanalization, patients are closely monitored in an intensive care or stroke unit for neurological status, hemorrhagic transformation, and other complications.

# **Outcomes and Benefits of Mechanical Embolus Removal**

Mechanical embolus removal for cerebral ischemia has significantly improved functional outcomes and reduced disability in patients with large vessel occlusion strokes. Clinical trials have demonstrated superior rates of recanalization and better neurological recovery compared to medical therapy alone.

## **Functional Recovery**

Patients treated with mechanical thrombectomy are more likely to regain independence in daily activities and have lower mortality rates. Early reperfusion limits infarct size and preserves brain function.

## Time Sensitivity

The benefits of mechanical embolus removal are highly time-dependent, emphasizing the importance of rapid diagnosis, patient transfer, and procedure initiation.

## Risks and Complications

Although generally safe, mechanical embolus removal carries potential risks and complications that must be considered and managed.

### Common Complications

- Intracranial hemorrhage due to vessel injury or reperfusion injury
- Vessel dissection or perforation during catheter navigation
- Distal embolization causing secondary occlusions
- Contrast-induced nephropathy
- Access site complications such as hematoma or pseudoaneurysm

### Risk Mitigation Strategies

Experienced operators, careful patient selection, and advanced imaging help reduce complications. Post-procedural monitoring allows early detection and management of adverse events.

## Post-Procedure Care and Rehabilitation

Following mechanical embolus removal for cerebral ischemia, comprehensive post-procedure care and rehabilitation are essential to optimize recovery and prevent recurrent stroke.

### Neurological Monitoring

Continuous neurological assessments identify changes in status that may indicate complications such as hemorrhage or edema. Blood pressure and other vital parameters are carefully managed.

## **Rehabilitation Strategies**

Early initiation of physical, occupational, and speech therapy supports functional recovery. Multidisciplinary teams tailor rehabilitation plans to individual patient needs.

## **Secondary Prevention**

Long-term management includes addressing stroke risk factors such as hypertension, atrial fibrillation, diabetes, and lifestyle modifications to reduce recurrence risk.

## **Future Directions and Innovations**

Ongoing research and technological advancements continue to refine mechanical embolus removal techniques and expand its applicability.

## **Novel Devices and Materials**

Development of smaller, more flexible devices aims to improve reach into distal vessels and reduce complications. Innovations in clot retrieval technology seek higher efficacy and safety.

## **Extended Time Windows and Imaging Advances**

Advanced imaging techniques allow identification of salvageable brain tissue beyond traditional time limits, potentially increasing the number of eligible patients for mechanical thrombectomy.

## **Integration with Other Therapies**

Combining mechanical embolus removal with pharmacological agents, neuroprotective therapies, and improved post-stroke care protocols promises enhanced outcomes.

## **Frequently Asked Questions**

### **What is mechanical embolus removal for cerebral ischemia?**

Mechanical embolus removal is a minimally invasive procedure used to remove

blood clots or emboli from cerebral arteries to restore blood flow and treat acute ischemic stroke caused by cerebral ischemia.

## **When is mechanical embolus removal recommended for cerebral ischemia patients?**

Mechanical embolus removal is typically recommended for patients experiencing acute ischemic stroke within a certain time window (usually up to 24 hours from symptom onset) who have large vessel occlusions and are eligible for endovascular therapy.

## **What are the common devices used in mechanical embolus removal for cerebral ischemia?**

Common devices include stent retrievers, aspiration catheters, and thrombectomy devices designed to mechanically extract or aspirate the clot from cerebral arteries.

## **How effective is mechanical embolus removal compared to medical thrombolysis for cerebral ischemia?**

Mechanical embolus removal has been shown to be more effective than intravenous thrombolysis alone in patients with large vessel occlusions, leading to higher rates of recanalization and better functional outcomes.

## **What are the risks or complications associated with mechanical embolus removal in cerebral ischemia?**

Risks include vessel injury, hemorrhage, embolization of clot fragments, infection, and anesthesia-related complications, though these are relatively low with experienced operators.

## **How has recent research influenced the guidelines for mechanical embolus removal in cerebral ischemia?**

Recent clinical trials and meta-analyses have expanded the therapeutic window and refined patient selection criteria, leading to updated guidelines recommending mechanical thrombectomy as standard care for eligible patients with acute ischemic stroke due to large vessel occlusion.

## **Additional Resources**

### *1. Mechanical Thrombectomy in Acute Ischemic Stroke: Techniques and Outcomes*

This book provides a comprehensive overview of mechanical thrombectomy procedures used to treat acute ischemic stroke. It covers the latest devices, techniques, and procedural strategies for embolus removal. Additionally, it

discusses patient selection criteria and clinical outcomes based on recent trials. The text is designed for neurologists, interventional radiologists, and neurosurgeons.

## *2. Endovascular Approaches to Cerebral Ischemia: Mechanical Embolus Extraction*

Focusing on endovascular techniques, this book delves into the various mechanical methods for embolus removal in cerebral ischemia. It highlights device design, procedural steps, and complication management. Case studies illustrate practical applications and decision-making in different clinical scenarios.

## *3. Stroke Intervention: Mechanical Embolus Removal and Revascularization Strategies*

This text explores the role of mechanical embolus removal within the broader context of stroke intervention and revascularization. It examines the integration of mechanical thrombectomy with pharmacologic treatments like thrombolysis. The book also discusses advancements in imaging that guide intervention.

## *4. Mechanical Embolus Removal Devices: Principles and Practice*

A detailed guide to the engineering and functional principles of mechanical embolus removal devices, this book is intended for clinicians and biomedical engineers. It covers device types such as stent retrievers and aspiration catheters, and their clinical application in cerebral ischemia. The book also reviews clinical trial data and future innovations.

## *5. Cerebral Ischemia and Mechanical Thrombectomy: Clinical Perspectives*

This book provides an in-depth clinical perspective on managing cerebral ischemia through mechanical thrombectomy. It discusses patient evaluation, procedural planning, and post-procedural care. The text includes chapters on complication management and long-term patient outcomes.

## *6. Advances in Mechanical Embolus Removal for Acute Stroke*

Highlighting recent technological and procedural advances, this book focuses on improving efficacy and safety in mechanical embolus removal. It reviews novel devices, imaging techniques, and combined therapeutic approaches. The book is aimed at specialists seeking the latest research and clinical guidelines.

## *7. Interventional Neuroradiology: Techniques in Mechanical Embolus Removal*

This practical manual serves as a step-by-step guide for interventional neuroradiologists performing mechanical embolus removal. It covers device selection, procedural nuances, and troubleshooting tips. High-quality illustrations and procedural videos complement the detailed instructions.

## *8. Neuroendovascular Treatment of Ischemic Stroke: Mechanical Embolus Removal*

This comprehensive volume addresses the neuroendovascular treatment options for ischemic stroke, with a focus on mechanical embolus removal. It integrates anatomical, pathological, and technical information to aid decision-making. The book also discusses rehabilitation and secondary

prevention following intervention.

#### 9. *Mechanical Thrombectomy: From Bench to Bedside in Cerebral Ischemia*

Bridging basic science and clinical practice, this book examines the translational research behind mechanical thrombectomy for cerebral ischemia. It reviews device development, experimental models, and clinical trial findings. The text is suited for researchers, clinicians, and students interested in stroke therapy innovation.

## **Mechanical Embolus Removal For Cerebral Ischemia**

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**mechanical embolus removal for cerebral ischemia: Neuroprotective Therapy for Stroke and Ischemic Disease** Paul A. Lapchak, John H. Zhang, 2017-01-12 A critical and comprehensive look at current state-of-the-art scientific and translational research being conducted internationally, in academia and industry, to address new ways to provide effective treatment to victims of ischemic and hemorrhagic stroke and other ischemic diseases. Currently stroke can be successfully treated through the administration of a thrombolytic, but the therapeutic window is short and many patients are not able to receive treatment. Only about 30% of patients are cured by available treatments. In 5 sections, the proposed volume will explore historical and novel neuroprotection mechanisms and targets, new and combination therapies, as well as clinical trial design for some of the recent bench-side research.

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**mechanical embolus removal for cerebral ischemia:** *Advances and Technical Standards in Neurosurgery* Johannes Schramm, 2014-11-19 This volume of *Advances and Technical Standards in Neurosurgery* covers some important new developments in functional neurosurgery and endovascular therapy. In the Technical Standards section a variety of topics are considered, including optic pathway gliomas, pineal lesions, cavernous sinus meningiomas and the eternal problem of minor and repetitive head injury. Endovascular treatment of a variety of lesions is now common practice and the state of the art in endovascular treatment for acute ischemic stroke is reviewed. An appraisal of the evidence on whether there is a place for microsurgical vascular decompression for essential hypertension raises interesting questions. The volume is completed by contributions on neurosurgical treatment of cluster headaches and occipital nerve stimulation.

**mechanical embolus removal for cerebral ischemia:** *Acute Stroke Management in the Era of Thrombectomy* Edgar A. Samaniego, David Hasan, 2019-06-22 This book contains a compilation of the revolution of mechanical thrombectomy (MT) in the treatment of strokes. The initial chapters summarize information about the best medical management of acute ischemic stroke, imaging modalities and patient selection for MT. The book then focuses on the nuances of MT, providing detailed information about the best approaches for anesthesia during MT, access, intra-arterial thrombolysis, recent devices and catheters and technical pitfalls of MT. A specific chapter is dedicated to MT in the venous system. This is followed by a chapter about the most common complications of MT and post-procedural care of these patients. The last chapter covers different aspects of acute stroke care and MT in the developing world. The authors of this book comprise of a multidisciplinary group of world experts in the field and were encouraged to include teaching cases to deliver a book with a practical approach. *Acute Stroke Management in the Era of Thrombectomy* is intended for all healthcare providers who care for patients with stroke; with special emphasis for the proceduralists who are interested in technical tips to improve outcomes and minimize complications.

**mechanical embolus removal for cerebral ischemia:** Cerebral Ischemic Reperfusion Injuries (CIRI) Weijian Jiang, Wengui Yu, Yan Qu, Zhongsong Shi, Benyan Luo, John H. Zhang, 2018-06-29 This volume is focused on subjects related to cerebral ischemia and reperfusion injuries after acute stroke. All chapters are selected from the Sixth Elite Stroke meeting named Pangu Stroke Conference and written by members of world leading laboratories of stroke studies. The contents cover both clinical and bench studies, from basic components of cerebral arterial system to clinical reperfusion injury cases, from reperfusion caused programmed cell death and astrocyte activation to oxidative stress and nitric oxide after reperfusion, from extracellular matrix and inflammation to a role of diabetes after reperfusion, from small artery disorders to collateral circulation and blood pressure control after reperfusion. Wei-Jian Jiang, Chairman of New Era Stroke Care and Research Institute of PLA Rocket Force General Hospital, Beijing, China. Wengui Yu, Professor and Director of Comprehensive Stroke & Cerebrovascular Center, University of California, Irvine Yan Qu, Professor and Director of Neurosurgery at the Second Affiliated Hospital of Air Force Medical University, Xi'an, China. Zhongsong Shi, Professor of Neurosurgery at Sun Yat-sen Memorial Hospital, Sun Yat-sen University, Guangzhou, China. Ben-yan Luo, Professor and Chair of Neurology at the First Affiliated Hospital of Zhejiang University. John H. Zhang, Professor of Anesthesiology and Physiology at Loma Linda University School of Medicine, Loma Linda, CA, USA.

**mechanical embolus removal for cerebral ischemia:** 12 Strokes Ferdinand K. Hui, Alejandro M. Spiotta, Michael J. Alexander, Ricardo A. Hanel, Blaise William Baxter, 2021-01-11 This comprehensive, case-based resource provides the state-of-the-art knowledge that can help readers improve access and optimize delivery of stroke thrombectomy. Improving access to stroke is of particular importance because patients often misinterpret their symptoms or cannot speak for themselves if they have aphasia. More importantly, access needs to be organized because stroke therapies are all extremely time-sensitive. Scalable, choreographed protocols are necessary for

emergency medical systems to 'capture' stroke patients and automatically transport and triage to time-sensitive treatments. Many of the chapters in the first section on Fundamentals and Systems provide valuable insight in improving access to stroke care. Replete with illustrative case studies and emphasizing that treatment approaches to stroke should not be comprised of a one-size-fits-all approach, this illuminating title provides the complete thought, detail, insight and organization that will help readers meet the needs of stroke patients with large vessel occlusions. *12 Strokes: A Case-based Guide to Acute Ischemic Stroke Management* examines the primary technical principles that underlie the current thrombectomy approaches. Instead of continuing the conceptual dichotomy of stent vs. aspiration, many of the chapters look at underlying principles and then discuss ways in which the currently available devices and approaches can best exploit them. The variety, creativity and detail in many of these chapters will help the reader develop a deeper understanding that might assist their ability to successfully take care of their next patient that 'doesn't follow the textbook.' In addition, the anatomic and pathophysiologic classification of the core Twelve Chapters will help readers organize their thinking and approach. This knowledge, particularly because it is organized based on common, challenging syndromes, will arm the reader to quickly recognize patterns and deftly adapt their management approaches to the needs of the patient. An invaluable contribution to the clinical literature, *12 Strokes: A Case-based Guide to Acute Ischemic Stroke Management* will be of great interest to not only neurosurgeons and neurologists but other specialists, primary care providers, and trainees as well.

**mechanical embolus removal for cerebral ischemia:** *Stroke E-Book* James C. Grotta, Gregory W Albers, Joseph P Broderick, Scott E Kasner, Eng H. Lo, Ralph L Sacco, Lawrence KS Wong, Arthur L. Day, 2021-02-06 Authored by the world's foremost stroke experts, this classic text brings you fully up to date with current research findings and management approaches for cerebrovascular disease. *Stroke: Pathophysiology, Diagnosis, and Management, 7th Edition*, covers every aspect of this fast-moving field, and is an ideal resource for stroke specialists, general neurologists, and other medical professionals with an interest in stroke. You'll find expert clinical guidance, comprehensive pathophysiology coverage, data from recent trials, advances in diagnostic tests, full-color CT images, pathology slides, and much more, for a complete picture of today's stroke medicine. - Helps you recognize the clinical manifestations of stroke, use the latest laboratory and imaging studies to arrive at a diagnosis, and generate an effective medical and surgical treatment plan. - Keeps you abreast of the overwhelming volume of studies and guidelines in this dynamic field, providing clear summaries and practical evaluations of all relevant data. - Contains updates throughout, including the latest clinical trials (thrombectomy, DAWN, DEFUSE), genetics research, prevention research, new therapies, and the new guidelines from the ASA. - Includes new slides for lectures, covering basic science, case studies, and interventional treatment overviews. - Features a Key Points summary at the beginning of each chapter so you can quickly find important information. - Provides abundant full-color CT images and pathology slides that help you make efficient and accurate diagnoses.

**mechanical embolus removal for cerebral ischemia:** *Toole's Cerebrovascular Disorders* E. Steve Roach, Kerstin Bettermann, Jose Biller, 2010-02-15 *Toole's Cerebrovascular Disorders* was the first modern book devoted to care of the stroke, originally published more than 40 years ago. This is a completely revised and updated sixth edition of the highly respected standard for stroke diagnosis and treatment. Dr James Toole has stayed on as a consultant for the text, and Drs E. Steve Roach, Kerstin Bettermann, and Jose Biller have reworked Dr Toole's book to include chapters on genetics, pregnancy-related stroke, and acute treatments. The practical focus of the book has not changed, retaining its emphasis on bedside diagnosis and treatment. Easily accessible both for stroke specialists and residents, the sixth edition has been modernized to keep pace with the rapid expansion of knowledge in stroke care and includes evidence-based recommendations, the latest technology and imaging, and risk factors. The text is supplemented with more than 200 images, many in color.

**mechanical embolus removal for cerebral ischemia:** *Urgent Interventional Therapies*

Nicholas N. Kipshidze, Jawed Fareed, Robert T. Rosen, George D. Dangas, Patrick W. Serruys, 2014-11-17 Illustrating the differences between urgent interventions and interventions performed to manage chronic conditions the authors present the chapters in a consistent template for ease of use covering; background, indications, evidence review, device description, procedural techniques, follow-up care, and complications. Shows the differences between interventions performed to manage chronic conditions and interventions that are truly urgent Chapters follow a consistent structure from background through indications, evidence review, device description, procedural techniques to follow-up care and complications More than 40 high definition videos, hosted on companion website [www.wiley.com/go/kipshidze/interventionaltherapies](http://www.wiley.com/go/kipshidze/interventionaltherapies), complete with tips and tricks, provide a visual learning tool

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**mechanical embolus removal for cerebral ischemia: Management of Stroke** Harold P. Adams, Gregory J. Del Zoppo, Rudiger Von Kummer, 2006 Diagnosis, evaluation, imaging, emergency evaluation and management, management of hemorrhagic stroke, therapies to restore or improve blood flow, neuroprotective therapies, and secondary prevention of stroke are discussed. Algorithms are presented for evaluation of suspected stroke, ordering of transesophageal or transthoracic echocardiography, assessment prior to treatment with rt-PA, and prevention of stroke.

**mechanical embolus removal for cerebral ischemia: Principles of Neurological Surgery** E-Book Richard Ellenbogen, Laligam Sekhar, Neil Kitchen, 2017-12-13 Perfect for anyone considering or training in this challenging specialty, *Principles of Neurological Surgery*, 4th Edition, by Drs. Richard G. Ellenbogen, Laligam N. Sekhar, and Neil Kitchen, provides a clear, superbly illustrated introduction to all aspects of neurosurgery—from general principles to specific techniques. Thorough updates from leading authors ensure that you'll stay abreast of the latest advances in every area of neurosurgery, including pre- and post-operative patient care, neuroradiology, pediatric neurosurgery, neurovascular surgery, trauma surgery, spine surgery, oncology, pituitary adenomas, cranial base neurosurgery, image-guided neurosurgery, treatment of pain, epilepsy surgery, and much more. - Offers comprehensive coverage without being encyclopedic - just the right amount of information for those in training or who need an introduction to the field. - Provides a strong visual understanding of the essentials of neurosurgery with abundant high-quality illustrations, including imaging, pathology, clinical and operative photographs, surgical line drawings, diagrams, tables, and figures. - Presents information in an easy-to-understand, well-written manner, helping you quickly grasp the principles and problems of today's neurosurgery. - Features new and improved videos, more emphasis on anatomy and radiology, and new evidence and techniques, keeping you up to date with the latest advances in the field. - Expert Consult™ eBook version included with purchase. This enhanced eBook experience allows you to search all of the text, figures, and references from the book on a variety of devices.

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to these questions in this book. But they will also be informed about the state of the art treatment in the daily stroke therapy.

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**mechanical embolus removal for cerebral ischemia: The Stroke Book** June Biermann, Barbara Toohey, 2005-03-03 An indispensable, sensitive guide for stroke sufferers and those who care for them According to the U.S. Centers for Disease Control, an American suffers a stroke every forty-five seconds. More than 700,000 Americans each year find themselves struggling to recover from this affliction—and many hundreds of thousands more are there to help them mend. June Biermann, a stroke survivor, and her coauthor—and caregiver—Barbara Toohey, authors of the bestselling Diabetic's Total Health and Happiness Book, offer this essential source for those recovering from a stroke and those providing them with support. The Stroke Book offers readers: - Clear explanations of the science of this often misunderstood condition - Information on what to expect at the hospital and in rehabilitation - Analyses of encouraging new developments in stroke therapy, including basic and alternative therapies, and traditional and cutting-edge medications - Advice on coping with complex rehabilitation needs, including adjustments for nutrition, mobility, and everyday living, and on understanding after-stroke emotional and cognitive changes - Suggestions for preventing future strokes - Information on how people recovering from a stroke can reclaim their independence and quality of life—and how caregivers can manage their own stresses and sorrows - Heartening words on keeping hope alive with patience and fortitude, and the curative power of humor - Inspiring stories of the stroke and recovery experiences of well-known individuals With stroke now the leading cause of serious, long-term disability in the United States, Biermann and Toohey's optimistic, user-friendly guide to living well after an attack is a vital tool for recovery.

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**mechanical embolus removal for cerebral ischemia: Stroke Medicine** Hugh Markus, Anthony Pereira, Geoffrey Cloud, 2010 A practical handbook written for the practising physician 'Stroke Medicine' provides an up-to-date, and easily accessible source of information on all aspects of stroke care from acute care, through to rehabilitation and secondary prevention.

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