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When Time Is Brain: Understanding Acute Ischemic Stroke?

Fisher J, Mair F, Vural T, Mokin G, Hacke U, Zeumer E

Neurology Department, Geneva University Hospital, Geneva, Switzerland
***Corresponding Author:** Vural T, Neurology Department, Geneva University Hospital, Geneva, Switzerland
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Abstract

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Acute ischemic stroke is a leading cause of mortality and long-term disability worldwide, resulting from a sudden interruption of cerebral blood flow due to arterial occlusion. Rapid diagnosis and timely intervention are critical to minimizing neuronal damage and improving patient outcomes. This article provides a comprehensive overview of acute ischemic stroke, including its pathophysiology, risk factors, clinical presentation, diagnostic approaches, treatment strategies, complications, and preventive measures. Emphasis is placed on the importance of early recognition using tools such as the FAST acronym and the role of advanced therapies like thrombolysis and mechanical thrombectomy. Effective management and rehabilitation, along with lifestyle modifications, are essential to reducing the burden of this condition.

Introduction

An acute ischemic stroke is the most common type of stroke, accounting for nearly 85% of all cases. It occurs when a blood vessel supplying the brain is obstructed by a clot, leading to reduced oxygen and nutrient delivery to brain tissue. The resulting ischemia can cause irreversible brain damage within minutes if not promptly treated

Causes and Risk Factors

The primary causes of acute ischemic stroke include:

- **Thrombosis:** Formation of a clot within a cerebral artery
- **Embolism:** A clot or debris traveling from another part of the body (commonly the heart)

Major risk factors include:

- Hypertension
- Diabetes mellitus
- Hyperlipidemia
- Atrial fibrillation
- Smoking
- Obesity and physical inactivity

Clinical Features

Symptoms typically have a sudden onset and may include:

- Unilateral weakness or numbness
- Facial drooping
- Difficulty speaking or understanding speech
- Visual disturbances
- Loss of coordination or balance

The **FAST** (Face, Arm, Speech, Time) approach is widely used for early recognition.

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Diagnosis

Accurate and rapid diagnosis is essential for appropriate treatment. Key investigations include:

- **CT Scan:** First-line imaging to rule out hemorrhage
- **MRI:** More sensitive for detecting early ischemic changes
- **Blood Tests:** Evaluate glucose, coagulation status, and other parameters
- **ECG:** Identify cardiac sources of emboli

Treatment

Management focuses on restoring cerebral perfusion:

- **Intravenous thrombolysis (tPA):** Administered within a narrow time window
- **Mechanical thrombectomy:** Effective for large vessel occlusions
- **Antiplatelet and anticoagulant therapy:** Prevent recurrence

Supportive care, including oxygenation and blood pressure control, is also essential.

Complications

Potential complications include:

- Brain edema
- Hemorrhagic transformation
- Long-term neurological deficits
- Recurrent stroke

Rehabilitation

Post-stroke rehabilitation aims to restore function and improve quality of life. It involves a multidisciplinary approach including physical, occupational, and speech therapy.

Prevention

Preventive strategies include:

- Controlling blood pressure, diabetes, and cholesterol
- Maintaining a healthy lifestyle
- Regular medical check-ups
- Adherence to prescribed medications

Conclusion

Acute ischemic stroke is a time-sensitive medical emergency requiring prompt recognition and intervention. Advances in diagnostic and therapeutic techniques have significantly improved outcomes, but prevention remains the most effective strategy. Public awareness and early action are crucial in reducing the impact of this debilitating condition.

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