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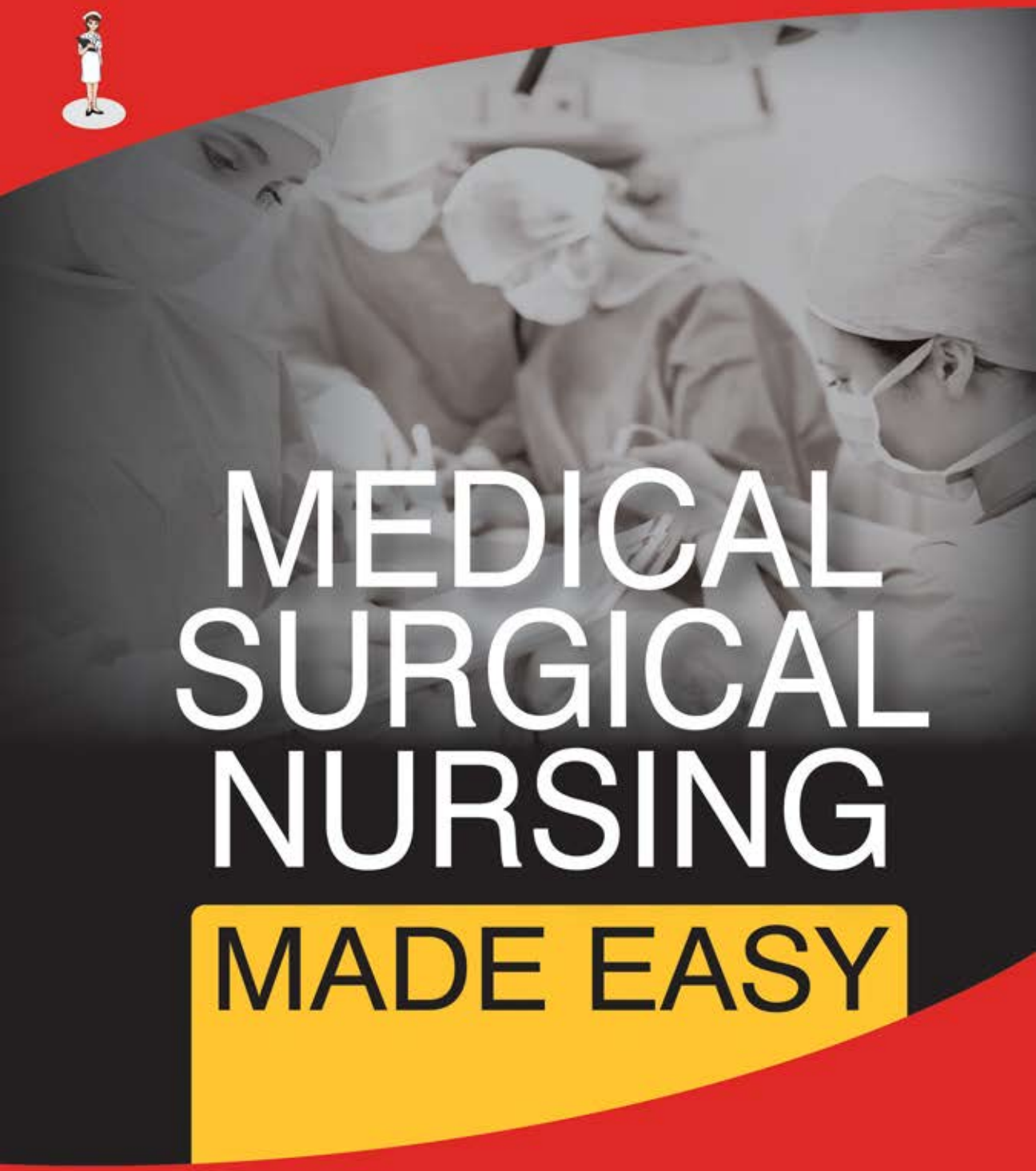

MEDICAL SURGICAL NURSING

MADE EASY

Seenidurai Paulraj

JAYPEE

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1
CHAPTER

Disorders of Nervous System

CHAPTER OUTLINE

- Alzheimer's disease
- Amyotrophic lateral sclerosis
- Bell's palsy
- Brain abscess
- Cerebral infarction
- Coma
- Decompression sickness
- Delirium
- Dementia
- Encephalitis
- Epilepsy or seizure
- Floppy infant syndrome
- Gilles de la Tourette syndrome
- Guillain-Barre syndrome
- Headache
- Herniated disc
- Huntington's disease
- Hydrocephalus
- Increased intracranial pressure
- Kennedy's disease
- Meningitis
- Moebius syndrome
- Multiple sclerosis
- Myasthenia gravis
- Myoglobinuria
- Neurosarcoidosis
- Paraneoplastic syndromes
- Parkinson's disease
- Prion disease
- Spinal cord injury
- Stroke
- Susac's syndrome
- Syncope
- Syringomyelia
- Thoracic outlet syndrome
- Transient ischemic attack
- Traumatic brain injury

ALZHEIMER'S DISEASE

Definition

Alzheimer's disease is a chronic, progressive, degenerative disease of the brain which interferes with memory, thinking, affect, and judgment.

Etiology

- Idiopathic
- Viral or bacterial infections
- Autoimmune dysfunction
- Genetic abnormalities
- Down's syndrome.

Risk Factors

- Advancing age
- Overproduction of Amyloid-beta
- Heredity
- Sex
- Mild cognitive impairment
- Lifestyle modification.

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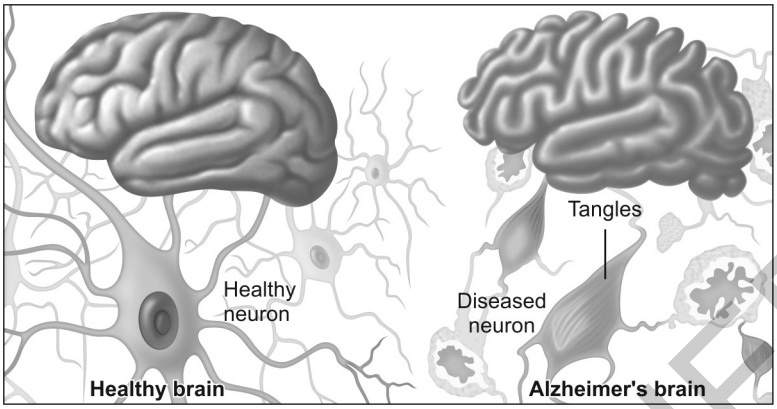


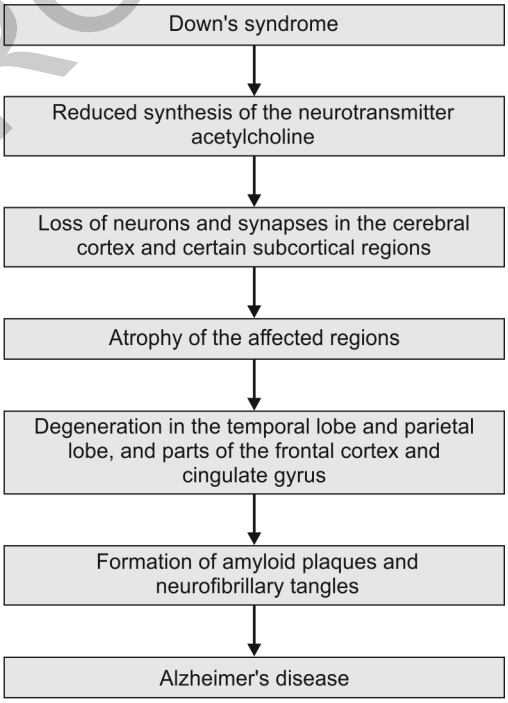
Fig. 1.1: Shows the comparison of a healthy brain and a brain with Azheimer's.

Types

There are three types of Alzheimer's disease as follows:

1. ***Mild Alzheimer's disease:***
   - Getting lost of oneself
   - Trouble in handling money and paying bills
   - Repeating questions
   - Taking much time than before to complete normal daily tasks
   - Poor judgment:
     - Losing things or misplacing them in odd places
     - Mood and personality changes
2. ***Moderate Alzheimer's disease:***
   - Increased memory loss and confusion
   - Problems of recognizing family members and friends
   - Inability to learn new things
   - Difficulty in carrying out tasks that involve multiple steps
   - Problems of coping with new situations
   - Delusions and paranoia
   - Impulsive behavior
3. ***Severe Alzheimer's disease:***
   - Inability to recognize oneself or family
   - Inability to communicate
   - Weight loss
   - Seizures
   - Skin infections
   - Difficulty in swallowing
   - Groaning, moaning, or grunting,
   - Increased sleep duration
   - Lack of bowel and bladder control.

Pathophysiology



Clinical Features

- Memory loss that affects job skills
- Difficulty in performing familiar tasks
- Problems with language

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- Disorientation to time and place
- Poor or decreased judgment
- Problems with abstract thinking
- Misplacing things
- Changes in mood or behavior
- Changes in personality
- Loss of initiative.

Complications

- Wandering tendency
- Getting lost
- Falls and combative behavior leading to injuries and fractures
- Infections
- Pneumonia.

Diagnostic Tests

- History
- Physical examination
- Magnetic resonance imaging
- Positron emission tomography
- Single photon emission computed tomography
- Urine testing
- Histopathological examination
- Neuropsychological testing
- Electrocardiogram
- Blood tests
- Thyroid function test.

Management

Medical

- **Acetylcholinesterase inhibitors:** It reduces the rate at which acetylcholine is broken down, thereby increasing the concentration of acetylcholine in the brain and combating the loss of acetylcholine caused by the death of cholinergic neurons. For example, donepezil, galantamine, rivastigmine, etc.
- **N-Methyl D-Aspartate (NMDA) receptor antagonist:** It acts on the glutamatergic system by blocking NMDA receptors and inhibiting their overstimulation by glutamate. For example, Memantine.
- **Selective serotonin reuptake inhibitors:** It helps in improving cognitive ability. For example, sertraline, fluvoxamine, citalopram, fluoxetine, etc.
- **Neuroleptics:** It helps to reduce aggression and improves cognitive behavior. For example, haloperidol, loxapine, risperidone, olanzapine, etc.
- **Antioxidants:** It slows down progression of the disease by preventing nerve cell damage by destroying toxic free radicals. For example, vitamin-C, vitamin-A, selegiline, etc.

Nursing

- Maintain patient's usual routines as much as possible
- Communicate clearly to the patient
- Reduce stressors such as fatigue, overstimulation or pain
- Involve family members in care
- Keep them active-physically, mentally and socially.

AMYOTROPHIC LATERAL SCLEROSIS (LOU GEHRIG'S DISEASE)

Definition

It is a progressive neurodegenerative disease that attacks the nerve cells (neurons) in the brain and the spinal cord that control voluntary muscles.

Etiology

- Gene mutation
- Chemical imbalance
- Disorganized immune response
- Protein mishandling.

Risk Factors

- Heredity
- People between the age 40 to 60 years
- Men
- Smoking
- Lead exposure
- People in military service.

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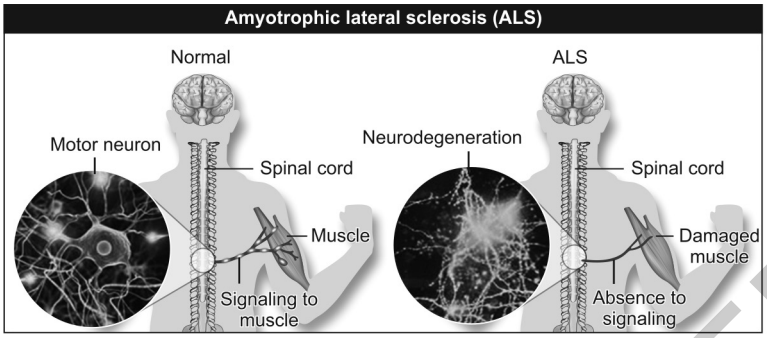
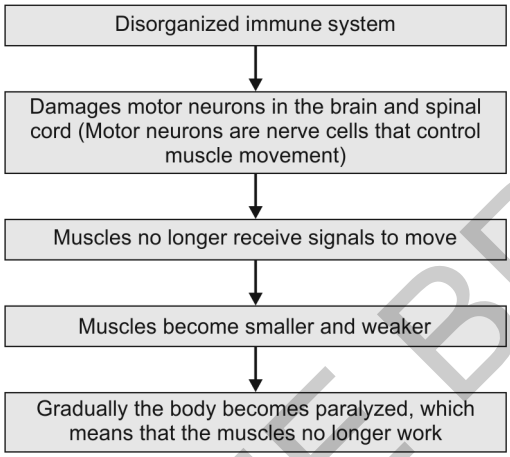


Fig. 1.2: Shows the comparison of a normal brain and amyotrophic lateral sclerosis (ALS).

Pathophysiology



Clinical Features

Initial Symptoms

- Twitching
- Cramping
- Weakness in the legs and arms
- Difficulty speaking, chewing or swallowing.

Late Symptoms

- Weight loss
- Fatigue
- Exaggerated reflexes
- Decreased coordination.

Complications

- Respiratory problems
- Muscle twitches
- Muscle tightness
- Eating problems
- Speaking problems
- Dementia.

Diagnostic Tests

- History
- Physical examination
- Electromyography—to detect electrical activity in muscles
- Nerve conduction study (NCS)—to measure electrical energy by assessing the nerve's ability to send a signal
- Magnetic resonance imaging
- Spinal tap (lumbar puncture)
- Muscle biopsy.

Management

Medical

- **Anti-glutamates:** It prevents the damage that can result from the nerve cell being overexcited by glutamate, an amino acid that affects nerves that sends messages from the brain to muscles. For example, riluzole, etc.
- **Anticonvulsants:** It helps in easing cramps. For example, phenytoin sodium, diazepam, etc.
- **Anti-spastic agent:** It helps in relieving stiffness in limbs and the throat. For example, lioresal, gablofen, etc.

Nursing

- Promote adequate nutritional intake
- Establish effective means of communication

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- Initiate use of word boards or letter board if unable to use arms
- Keep them as active as possible
- Encourage verbalization of feelings.

BELL'S PALSY

Definition

The temporary paralysis of one or both the facial nerves which results due to damage or trauma may finally lead to inability to control facial muscles on the affected side is known as Bell's palsy.

Etiology

- Acute mononeuropathy (disease involving only one nerve)
- Idiopathic
- Viral infections (Herpes simplex 1 type)
- Bacterial infections
- Auto immune disorders.

Risk Factors

- Stress
- Lack of sleep
- Minor illness
- Physical trauma
- Upper respiratory tract infections
- Diabetes
- Pregnancy during third trimester
- Upper respiratory tract infections.

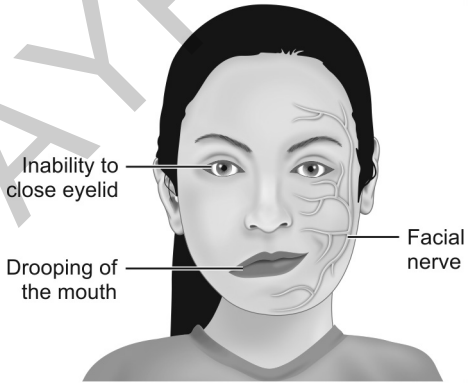
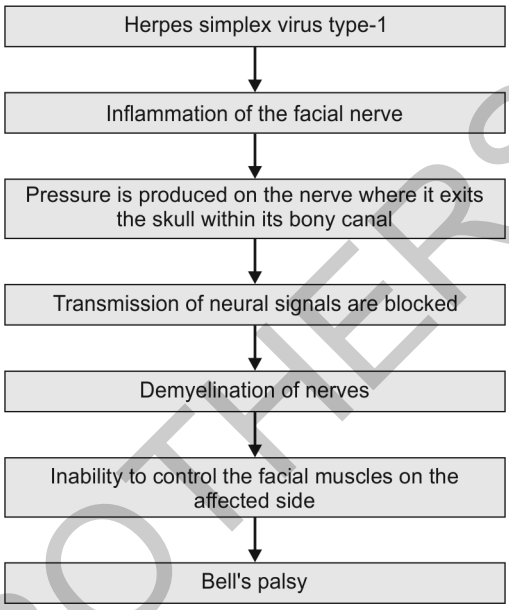


Fig. 1.3: Depicts the cardinal features of Bell's palsy.

Pathophysiology



Clinical Features

- Facial drooping on the affected side
- Facial tingling
- Pain persists behind the ears
- Vertigo
- Dizziness
- Hearing loss
- Severe headache
- Neck pain
- Memory problems
- Balance problems
- Ipsilateral limb paresthesia
- Ipsilateral limb weakness
- Sense of clumsiness
- Swollen and tender lymph nodes.

Complications

- Corneal damage
- Poor nutrition
- Depression
- Ageusia (loss of taste)
- Chronic facial spasm
- Crocodile tear syndrome (the client shed their tears while they are eating)

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- Irreversible damage to facial nerves
- Synkinesis
- Misdirected regrowth of nerve fibers.

Diagnostic Tests

- History
- Physical examination
- Electromyography
- X-ray
- Magnetic resonance imaging
- Computerized tomography.

Management

Medical

- **Corticosteroids:** It helps to reduce inflammation and edema and this inturn reduces vascular compression and permits restoration of blood circulation to the nerve. For example, prednisone.
- **Analgesics:** It helps to relieve facial pain. For example, ibuprofen, acetaminophen, aspirin, etc.
- **Antiviral agents:** It helps to prevent any secondary infection due to a viral agent. For example, valacyclovir, famciclovir, acyclovir, etc.

Nursing

- Encourage to maintain adequate nutritional status.
- Encourage to maintain appropriate oral hygiene.
- Protect the eye using lubricating eye drops during the day and an eye ointment at night.
- Apply moist heat by putting a wash cloth soaked in warm water on your face several times a day.
- Massage and exercise the face to relax the facial muscles.

BRAIN ABSCESS

Definition

Brain abscess is an accumulation of pus within the brain tissue that can result from a local or a systemic infection.

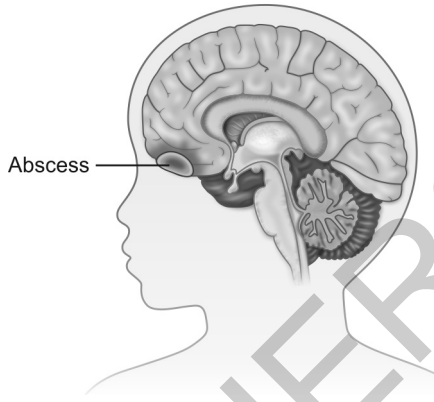


Fig. 1.4: Shows the abscess formation in the ventricles due to brain abscess.

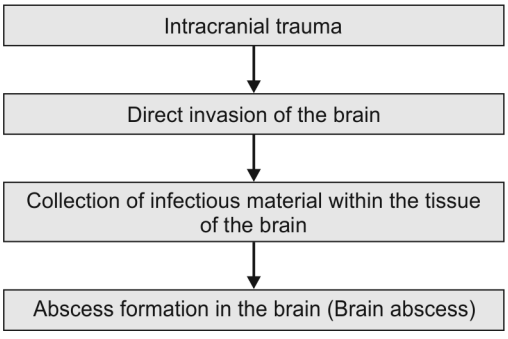
Etiology

- Pulmonary infection
- Bacterial endocarditis
- Skull fracture
- Brain trauma
- Surgery
- Sinus infection
- Spread of infection from nearby sites such as ears, teeth, etc. (Otitis media, dental sepsis, etc.).

Risk Factors

- White race
- Advanced age
- Exposure to radiations
- Exposure to chemicals
- Family history of brain tumor.

Pathophysiology



Clinical Features

- Headache usually worse in the morning
- Decreased vision

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- Drowsiness
- Confusion
- Seizures
- Weakness of the extremity
- Fever
- Nausea
- Vomiting
- Irritability
- Disoriented behavior.

Complications

- Weakness
- Vision changes
- Headache
- Personality changes
- Hearing loss
- Seizure.

Diagnostic Tests

- History
- Physical examination
- Computed tomography
- Magnetic resonance imaging scan.

Management

Medical

- **Antimicrobial therapy:** It helps to reduce its virulence. For example, penicillin–G, Chloramphenicol, etc.
- **Corticosteroids:** It helps to reduce the inflammatory cerebral edema. For example, dexamethasone.
- **Antiepileptics:** It helps to prevent the attack of seizures. For example, phenytoin, phenobarbital, etc.

Surgical

Surgical incision and aspiration.

Nursing

- Provide symptomatic treatment
- Prepare client for surgery, if indicated
- Maintain the blood pressure at 150/100 mm Hg or less than that to facilitate perfusion.
- Provide complete bed rest.

CEREBRAL INFARCTION

Definition

A cerebral infarction is an ischemic stroke resulting from a disturbance in the blood vessels supplying blood to the brain.

Etiology

- Atherosclerotic occlusion of large vessels
- Embolic occlusion of distal vessels
- Vasculitis

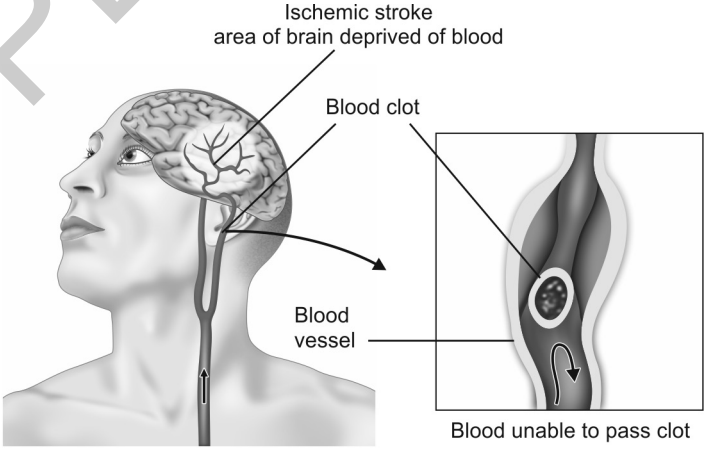

Fig. 1.5: Shows the cerebral infarction in the brain.

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- Arterial spasm
- Sickle cell disease
- Inherited metabolic disorders
- Systemic lupus erythematosus
- Meningitis
- Hypercoagulability
- Fibromuscular dysplasia.

Risk Factors

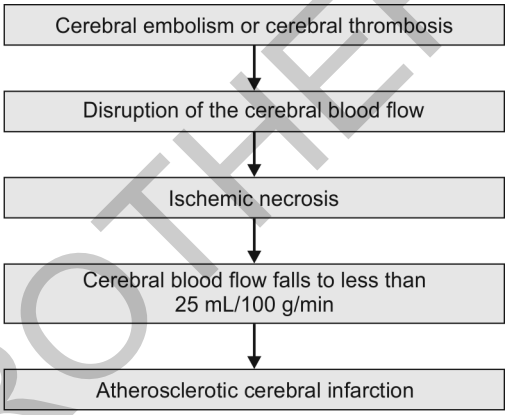
- High blood pressure
- Diabetes mellitus
- Hyperlipoproteinemia
- Hypercholesterolemia
- Tobacco smoking
- Obesity.

Types

There are three types of cerebral infarction as follows:

1. ***Atherosclerotic cerebral infarction:*** It is caused by the cerebrovascular cavity blockage or narrowing. It is the result of ischemic necrosis due to an insufficient blood supply to the brain. Patient may suffer aphasia, hemiplegia or other cerebral damages. It may take several days for symptoms to peak, but also can occur within minutes or seconds.
2. ***Hemorrhagic cerebral infarction:*** It is due to thrombosis or embolism that occurs to a major cerebral artery or branch. Blood leaks out of the artery and enters cerebral tissues. Cerebral tissues suffer anoxia, diffuse ischemia and weakened vessel and blood capillary walls. It was reported that up to 75% of hemorrhagic cerebral infarction patients incur another incident within 7 days of the initial occurrence. The sooner the opening occurs, the quicker the another hemorrhage will occur.
3. ***Lacunar cerebral infarction:*** It refers to old or new infarctions deep within the brain. When this occurs, lacunas or holes are formed. Depending on the infracted blood vessels, symptoms like limb numbness, dizziness, headache, aphasia and clumsiness may occur. This is due to the small arteries being blocked. Middle-aged and old people are at risk due to decreased blood flow as a result to body changes including increased blood lipids, enhanced platelet aggregation and increased blood viscosity.

Pathophysiology



Clinical Features

- Abrupt onset of weakness or paralysis of an arm, leg, side of the face or any part of the body
- Numbness
- Swallowing difficulties or drooling
- Loss of memory
- Aphasia
- Dysarthria
- Ataxia
- Diplopia
- Vertigo
- Loss of balance or coordination
- Personality changes
- Drowsiness
- Mood changes.

Complications

- Myocardial infarction
- Pneumonia
- Renal insufficiency
- Dementia
- Contractures
- Depression.

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- Serves as a ready reference text to the students and teachers from medical surgical nursing.

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