

MDC 4 - Examination 1 Blueprint

Iggy Chapter: Neurological-42, 43, 44, 45. Perioperative- 14, 15, 16

For all conditions you must understand the Pathophysiology, Clinical manifestations including labs, Possible problems (nursing Diagnosis), interventions and client teaching.

Alzheimer's: This is the most common type of Dementia that affects people older than 65

- Stages-

Mild stage- Independent in ADLs

Denies presence of symptoms

Forgets names and misplaces household items

Has short term memory loss and difficulty recalling new information

Subtle changes in personality

Decrease performance especially when stressed

Decreased sense of smell

Middle or Moderate stage-

Has impairment of all cognitive function

Demonstrates problem with handling or unable to handle finances.

Disoriented to place time and event

Possibly depressed or agitated

Is increasingly dependent in ADLs

Has difficulty driving and gets lost

Incontinent

Has episodes of wandering and trouble sleeping

Severe or stage three

Completely bedridden

Totally dependent in ADLs

Has loss of mobility and verbal skills

Has agnosia- Inability to recognize faces.

- Safety – The nurse will prevent injury or accident as well as elder abuse
- Caregiver care- Respite care
- Orientation vs validation- Orientation therapy is used for patients who are in the mild stage of Alzheimer's disease to orientate them to the environment
- While Validation therapy is used for patient with moderate or severe stage of Alzheimer's disease, this is used to acknowledge the patient's feelings and concerns.

- Routines-

Parkinson's Disease- This is a progressive neurodegenerative disease, it is a debilitating disease affecting mobility.

- Manifestations
 - Tremor
 - Muscle rigidity
 - Bradykinesia with rigidity
 - Postural instability
 - Depression
 - Drooling with slurred speech

Expressionless, fixed gaze (mask-like)

- Fall Prevention intervention- Priority Problems:
 - Decreased mobility (and possible self-care deficit) related to muscle rigidity, tremors, and postural instability
 - Potential for decreased self-esteem related to impaired cognition, tremors, and self-care deficit
 - Medication
- Dopamine agonists (stimulate dopamine receptors)
- Most effective early
- Apomorphine, pramipexole, ropinirole
- Sinemet (most common) combo of levodopa-carbidopa
- COMT inhibitors (prolong action of levodopa)
- Entacapone

- MAOIs (increase dopamine concentration)
- Rasagiline mesylate
- Dopamine receptor agonists (promote release of dopamine, later in disease)
- Bromocriptine mesylate
- Antiviral (anti-Parkinson benefits)
- Amantadine

Surgical management for Parkinson

- Stereotactic pallidotomy
Probing first, then scarring if probing successful
- DBS
Electrodes implanted into brain, generator like a pacemaker
- Dealing with clinical manifestations

Migraines- Migraine headaches are painful, unilateral, and throbbing in nature. The headache is associated with symptoms such as **nausea, photophobia, phonophobia, and visual changes**. The symptoms can last up to 72 hours. There may be known triggers such as stress, red wine, caffeine, and monosodium glutamate (MSG). If the client identifies a possible trigger, then the client is taught to avoid the suspected trigger. This therapy is known as trigger avoidance therapy. Migraine headaches may be associated with an **aura** such as a sensation or a visual change alerting the client that a headache is imminent.

The approach to therapy is abortive and preventive therapy. Abortive therapy is most affective when administering the prescribed medication during the aura or shortly after the headache has begun. Preventative therapy is used to suppress the onset of headaches that can occur as frequently as twice a week

- **Triggers-** pickled foods, chocolate, wine/beer, cultured food/dairy, nuts/butters, onions, tomatoes, caffeine, Beans, banana, citrus fruits, monosodium glutamate

Aura- sensation or a visual change alerting the client that a headache is imminent.

- **Abortive -** Acetaminophen (APAP), Ibuprofen (Motrin) NSAIDs, Naproxen (Naprosyn), Migraine HA tablets that contain caffeine, Triptan preparations

- sumatriptan (Imitrex)
- eletriptan (Relpax)
- naratriptan (Amerge)
- almotriptan (Axert)
-

Ergotamine preparations

- cafergot (Ergotamine)
- Dihydroergotamine (DHE)- Migranal
- Midrin

-
-
-

- vs. **preventative therapy**

Beta Blockers

- propranolol (Inderal)
- Timolol

Calcium Channel Blocker

- verapamil (Calan)

Antiepileptic drugs

- topiramate (Topamax)

Tricyclic antidepressant

- nortriptyline (Pamelor)
- onabotulinumtoxinA (Botox)

-

Multiple Sclerosis

- Medications
- Teaching

- **Meningitis**= Inflammation of meninges of brain and spinal cord

- Droplet-requirements- Surgical mask and proper hand hygiene

Causes

- Bacterial, viral most often, can be fungal, protozoal, sterile (cancer, drugs)
- Direct introduction: penetrating trauma, ruptured brain abscess, basilar skull fracture, infection in eye, ear, nose, mouth
- Meningococcal meningitis is highly contagious, high mortality rate

- Decreased or changed LOC. Disorientation to person, place, year
- Nuchal rigidity, Brudzinski, Kernig's signs
- Pupil reaction & eye movements: Photophobia, nystagmus, abnormal eye movements

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- Motor response: Normal early, later hemiparesis, hemiplegia, decreased muscle tone; cranial nerve dysfunction (CN III, IV, VI, VII, VIII)
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- Memory changes: Attention span (short), personality & behavior changes, bewilderment, severe/unrelenting headaches
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- General: Generalized muscle aches and pain, nausea and vomiting, fever and chills, tachycardia, red macular rash (meningococcal meningitis)

Laboratory Assessment

- CSF analysis,
- Immune electrophoresis on CSF
 - Gram stain for bacterial source
 - WBC elevated
 - CT/MRI brain
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- **Lumbar Puncture-** Precautions are taken for clients over the age of 60 presenting with signs of increased Intracranial Pressure (ICP). For client's that are suspected of having increased ICP, the primary care provider will order a CT and delay evaluation by lumbar puncture (LP) until the procedure is considered safe to

perform. During the LP, a sample of the CSF is sent for analysis to identify causative organisms. Treatment is not delayed, and a broad-spectrum antibiotic is delivered until culture and gram stain results are returned in 72 hours. Drug treatment should begin within one-to-two hours after prescribed.

-
- **Complication:** increase ICP, tonsillectomy.

- **Seizures-** Abnormal, sudden, uncontrolled electrical discharge of neurons

- Types of seizures-
- Generalized
- Tonic-clonic (2-5 minutes, LOC)
 - Tonic (30 sec to several minutes, LOC)
 - Clonic (several minutes, LOC)
 - Myoclonic (few seconds, symmetric or asymmetric)
 - Atonic (seconds), most resistant to drug therapy
- Partial seizure
- Complex (LOC 1-3 minutes), automatisms
- Simple (remains conscious), aura sensation, unilateral movement, sensations, change in heart rate, flushing, or epigastric discomfort
 - Antiepileptic drugs (AEDs)
- Aura, postictal
- Seizure precautions

- **Status Epilepticus:** Medical emergency and life threatening

- Continuous cycle of tonic-clonic activity with short periods of calm in between cycles

- Hypoxia

- Hyperthermia

- Hypoglycemia

- Exhaustion

- what is it? Interventions

Nursing Management of seizure

Maintain airway patency

Remain with the client

Turn client to side

Blow by Oxygen

Suction

Nothing by mouth

Do not restrain-keep safe

Client and family support after care

- Time the length and duration of seizure activity
- Note parts of the body involved
- Note facial expression
- Observe for injury particularly around and in mouth such as biting the tongue
- If able assess pupils
- Document type of incontinence
- Continue to observe through the postictal period
- LOC
- Orientation to place person and time
 - Seizure lasting longer than 5 minutes or repeated over 30 minutes
 - Treat with **lorazepam or diazepam**
 - IV phenytoin or fosphenytoin may be added (among others)
 - Causes: sudden withdrawal from AEDs, infection, acute alcohol/drug withdrawal, head trauma, cerebral edema, metabolic disturbances

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-

Medication teaching,

- DMV- Treat with **lorazepam or diazepam**
- Antiepileptic medication like
 - Phenytoin
 - Divalproex sodium
 - Carbamezepine
 - Gabapentine
 - Lomatrigine
 - Diazepam
 - Lorazepam
 - Phenobarbital

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Increased ICP:

- Clinical manifestations (early vs. late)
- Interventions/meds
- Brain herniation
- Cushing's triad

Stroke

A client that is having a stroke is treated as a medical emergency. The earlier that medical intervention occurs, the better the chance of reducing or even preventing permanent disability.

Glucose and Oxygen

Glucose and oxygen are the two things the brain cannot store, and therefore the brain requires a constant uninterrupted blood flow (perfusion). It only takes a few moments for interrupted blood flow to result in cerebral tissue death. That infarct causes permanent loss of neurological function in various symptomatology.

Types of Strokes

There are two types of stroke, ischemic and hemorrhagic. Ischemic stroke is caused by a blockage in the cerebral or carotid artery. A stroke can be caused either by a clot (thrombotic stroke) or by an embolus (dislodged clot) known as an embolic stroke.

Hemorrhagic Stroke This occur when part of the blood flow in our brain is blocked, and after a few minute the starve brain cell begins to die. Here abnormal bleeding disrupts normal blood flow. A blood vessel burst spilling blood unto our brain while robing the intended tissue of nourishment

Treatment include emergency surgery to repair damaged arteries and medication to help the blood flow return to normal

Ischemic Stroke- Here an artery in the brain narrows or becomes completely blocked preventing normal blood flow. The blockage may be caused by a clot also called a thrombus which forms in an unhealthy artery of the brain. The lack of blood flow causes the tissue to be starved or ischemic

- TIAs
 - Temporary neurologic dysfunction from brief interruption in cerebral blood flow
- **Symptoms include**
 - Visual: blurred vision, diplopia, blindness in one eye, tunnel vision
 - Mobility: unilateral weakness, ataxia
 - Sensory: unilateral numbness, vertigo
 - Speech: aphasia, dysarthria
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 - Predisposing factor(s):

● Modifiable

- Age
- Gender
- History of previous stroke
- Family history
- Race: American Indian, Alaskan Native, Black men, Hispanic/Latino men

- vs. nonmodifiable

- Hypertension
- Diabetes
- Hyperlipidemia
- Obesity
- Sedentary lifestyle
- Oral contraceptive use
- Smoking
- Excessive alcohol
- Atrial fibrillation

NIHSS SCORE	STROKE SEVERITY	IMPACTED BRAIN DENSITY
0	No Stroke	
0 – 4	Minor Stroke	
5 – 15	Moderate Stroke	
16– 20	Moderate to Severe Stroke	
21 - 42	Severe Stroke	

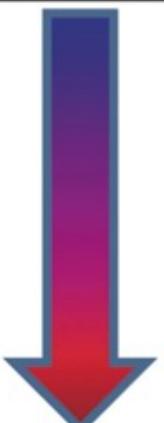


Figure 1. The National Institutes of Health Stroke Scale or NIH Stroke Scale (NIHSS) is a tool used by healthcare providers to objectively quantify and succinctly communicate the impairment caused by a stroke.

- **Stroke prevention**

SPOT A STROKE

LEARN THE WARNING SIGNS AND ACT FAST



B



BALANCE

LOSS OF BALANCE,
HEADACHE
OR DIZZINESS

E



EYES

BLURRED VISION

F



FACE

ONE SIDE OF THE
FACE IS DROPPING

A



ARMS

ARM OR LEG
WEAKNESS

S



SPEECH

SPEECH DIFFICULTY

T



TIME

TIME TO CALL
FOR AMBULANCE
IMMEDIATELY

CALL 911 IMMEDIATELY

Right Hemisphere

Visual deficit

Visual neglect

Impulsiveness

Lack of awareness of deficit

Poor judgement

Left sided weakness

Left Hemisphere

Language deficit

Anxiety /depression

Frustration

slow cautious

Right sided weakness

- **Symptoms: know left vs right and manifestations**

Stroke: Physical Assessment

Cognition

Proprioceptive function

Memory/ judgement/ concentration

Mobility

Hemiplegia/hemiparesis, ataxia, apraxia

Sensory

Unilateral neglect, hemianopia, paresthesia

Cranial Nerves

Gag reflex/swallow, eye movement, tongue movement

Cardiovascular

Heart murmur, dysrhythmia, HTN

Psychosocial

Emotional liability, depression

- Types: ischemic vs. hemorrhagic-know clinical manifestations and possible interventions

	Ischemic Stroke		Hemorrhagic Stroke
	Thrombotic	Embolic	
Evolution	Intermittent to complete stroke	Abrupt onset	Abrupt onset
LOC	Client is awake	Client is awake	Client is in a coma
Primary Cause(s)	HTN uncontrolled Obesity Diabetes Sedentary lifestyle Carotid stenosis	Cardiac disease (Atrial Fibrillation)	HTN Aneurysms Arterial malformations Cerebral hemorrhage Cocaine use
Warning Signs	TIA (warning) Mild headache, speech deficits, visual problems	TIA (warning)	Increased intracranial pressure (ICP)
Treatment	IV Fibrinolytic Therapy American Association new time frame to administer after onset of symptoms to 4.5 hours Blood pressure has to be below 185/110. Best practice to keep SBP	No treatment	Fibrinolytic therapy Contraindications Hemorrhagic stroke treatment Surgical resection

	<p>between 140 and 150 to promote cerebral tissue perfusion</p> <p>Contraindications of fibrinolytic therapy if client meets the criteria of one or more of the following categories;</p> <ul style="list-style-type: none"> Older than 80 years Anticoagulation regardless of international normalized ratio (INR) Imaging evidence of ischemic injury involving more than one third of the brain tissue supplied by the middle cerebral artery Baseline NIHSS score of more than 25 History of both stroke & diabetes Endovascular interventions Intra-arterial thrombolysis using drug therapy Mechanical embolectomy (clot removal) Carotid artery angioplasty with stenting 		Endo embolization Stere radiosurg
Diagnosi cs	CT PT/PTT & INR	CT PT/PTT & INR	CT scan Cerebral angiogram Lumbar puncture Toxicology screen
Medicatio ns	<p>Antithrombotic</p> <ul style="list-style-type: none"> Aspirin Antiplatelet drugs clopidogrel (Plavix) Anticoagulants (high alert) Coumadin Calcium Channel Blocker nimodipine (nimotop) Stool softeners Antianxiety 	<p>Atrial fib</p> <ul style="list-style-type: none"> Anticoagulants Could also be on others meds to treat Stroke/Cerebral Vascular Accident 	

- Fibrinolytic therapy
- Complications:
 - Increased ICP
- Thrombolytic therapy
- Risk for aspiration: Evaluation, interventions

Traumatic Brain Injury

- Complications
 - Increased ICP

- o CSF Leakage: interventions, testing
- o Bleeding: epidural, subdural
 - Treatment

Brain Death

- Diagnosis
- Organ donation

Brain Tumors

- Primary vs. secondary
- Treatment

Spinal Cord Injury

It is Saturday night in the local emergency department, and the anticipation of what is going to come through the doors is tense. In the US, spinal cord injury (SCI) is associated with the risk-taking behaviors of young males. No matter the mechanism of injury, SCI is devastating to both the client and family.

Spinal cord injury is classified as complete or incomplete (Ignatavicius, et.al., 2018). A complete spinal cord injury results in complete loss of function below the level of injury. The mechanism of injury that can result in SCI are as follows:

- **Hyperflexion:** Associated with diving accidents. It is defined as a “sudden and forceful acceleration of the head forward” which causes “extreme flexion of the neck.”
- **Hyperextension:** Associated with MVC from the rear. It causes an accelerated and then decelerated movement of the head. This can result in anterior longitudinal ligament tears, fractures, or subluxation of the vertebrae. It can also result in injury to the vertebral disc.
- **Vertical compression or Axial loading:** Associated with diving accident, falls, or a hard landing on the feet. Piece of bone can enter the spinal canal and damage the cord.
- **Excessive rotation:** turning the head beyond the normal range.
- **Penetrating trauma:** Classified further as high-speed gunshot wound (GSW) or low speed injury (stabbing).

When considering such a severe injury, there is a lot to consider during the initial gathering of data (Ignatavicius, et.al., 2018). The client may not be a good historian of the accident; it may be necessary to rely on others as eye witnesses to the mechanism of injury (MOI). Emergency medical services (EMS) will provide an in-depth report including MOI, initial assessment, GCS, immobilization provided, and treatments provided. It is important to know the client's history as well.

Priority of Care

Caring for a client that has experienced a SCI can be daunting. Remember to prioritize:

- Airway
- Breathing
- Circulation

SCI involving C3-5 innervate the phrenic nerve controlling the diaphragm. This can greatly compromise the client's ability to maintain their own airway.

Spinal Shock

Spinal shock occurs immediately after the injury which leaves the client with complete, but temporary, loss of motor, sensory, reflex, and autonomic function. This can last anywhere from 48 hours up to several weeks.

- Tetraplegia (Quadriplegia) - Involves all 4 extremities
- Paraplegia - Involves only the lower extremities

During spinal shock, the client is at risk for paralytic ileus which may develop within 72 hours of hospital admission. Once the swelling subsides, the spinal reflexes will return.

The neurologist will use a dermatome and document the zones of sensory and motor function. Another concern for the client with a SCI is that the client may be left with either spastic or flaccid bowel or bladder function.

Autonomic Dysreflexia (AD) - Life Threatening Condition

- Associated with high level SCI
- Causes by noxious visceral or cutaneous stimuli
 - Bladder distension
 - Urinary tract infection
 - Epididymitis
 - Scrotal compression
 - Bowel distention
 - Impaction from constipation
- Results in sudden, massive reflex sympathetic response
- Signs and symptoms
 - Sudden rise in systolic and diastolic BP accompanied with bradycardia
 - Profuse sweating above the level of the spinal injury
- Goosebumps occur on the skin above the lesion
- Flushing of the skin above the level of the lesion
- Blurred vision
- Changes in vision
- Severe throbbing headache

Complications are serious and can be fatal for a client with a SCI. There is a focus on client care that centers on preventing complications for immobility and skin breakdown. Nursing care to prevent complications are as follows:

- Turn the client every two hours and assess the skin for breakdown.
- Monitor vital signs, intake and output, and weight.
- Monitor the client's hydration and nutrition closely.
- Nutritional requirements that are important to monitor are proteins, vitamins, and iron, particularly for the client that is quadriplegic and is unable to drink or eat without assistance. Since the client is immobile, bones are at risk for developing osteopenia which puts the client at risk for fractures. Another complication of immobility is the development of **venous thromboembolism (VTE)**. The client will be on an anticoagulation or antiplatelet to prevent the formation of VTE.

Caring for a Client with SCI

The desired outcome is stabilizing the vertebral column, minimize damage to the spinal cord, and prevent secondary injuries. If the client has a fracture, another layer of protection is added. Further damage to the spinal cord is prevented by applying an immobilizing device. Initially, a hard collar is placed to stabilize the cervical fracture. The

goal is to maintain vertebral alignment. Next, the client may be placed in fixed skeletal traction. A common device is immobilization of the cervical spine in a halo fixator. This traction may stay in place 8 to 12 weeks.

- **Tizanidine, baclofen** for spasticity
- Risk Factors
- Interventions
- Level of the injury
- Complications
 - Autonomic dysreflexia: prevention and treatment

Myasthenia Gravis

- Complications
 - Cranial nerves
 - Myasthenic vs. cholinergic crisis
- Medications

Guillain-Barre

- Progression
- Causes
 - Virus
- Complications/interventions

Bell's Palsy

- r/o stroke
- Clinical manifestations
- Meds

Trigeminal Neuralgia

Preoperative

- Consents
 - Implied
 - Informed
 - Minors
- Pre-op checklist
 - Labs
 - NPO status
- Teaching
- Pre-op meds
- Safety

Intraoperative

- Types of Surgeries

- Types of anesthesia and considerations
- Staff members and responsibilities
- Malignant Hyperthermia: Interventions, Dantrolene
- Safety: Infection prevention, fire safety, instruments

Postoperative

- Recovery
- Prevention of complications (VTE, Pneumonia, atelectasis, hypovolemic shock)
- Complications/interventions:
 - Dehiscence
 - Evisceration
- Pain management
 - PCA
 - Complications

Understand: Delegation, prioritization and therapeutic communication

Medications: (Therapeutic Effect, Side effects, Nursing Considerations)

Drug Class: Diuretics Mannitol Furosemide Spironolactone	Drug Class: Triptan sumatriptan eletriptan naratriptan almotriptan	Drug class: Ergotamine cafergot (Ergotamine) Dihydroergotamine (DHE)- Migranal Midrin
Antiseizures meds: Phenytoin Fosphenytoin Carbamazepine Valproic acid Gabapentin Pregabalin Levetiracetam Topiramate	Cholinesterase Inhibitor: Pyridostigmine Immunosuppressive drugs or corticosteroids BAClofen	Drugs for Parkinson's: Sinemet Levodopa MAOI Inhibitors Benztropine
	Drugs for Alzheimer's: Cholinesterase inhibitors Memantine SSRIs Antipsychotics	

Diagnostics: know nursing considerations

- Plain CT
- CT with contrast
- MRI
- Glasgow Coma Scale: Scores, areas evaluated
- Lumbar puncture: position, contraindications, post-care

Laboratory Values

Electrolytes	Value	Comments
Na+	136-145 mEq/L	

K+	3.5-5 mEq/L	
Ca++	9.0-10.5 mg/dL	
Mg	1.3-2.1 mg/dL	
CBC		
Hgb	Men 14-18 g/100 ml, Women 12-16 g/100 mL	
Hct	Men 42-52%, Women 37-47%	
WBC	5,000-10,000/mm3	
Cardiac		
Platelets	150,000-400,000	
PT	PT = 11-12.5 sec (Rx 2-3 times)	
aPTT	30-40 sec (Rx 1.5-2 times)	
INR	0.7-1.1 (Rx 2-3 times)	
Renal		
BUN	10-20 mg/dL	
Creatinine	0.6 - 1.2 mg/dL	
Urine Specific Gravity	1.005-1.030	

Dosage Calculation:

1. Order: infuse 1 L of NS over 8 hours. _____ mL/hr
2. Order: Heparin 2,000 units SQ 6 hours. Available: Heparin injection 5,000 units /mL. _____ mL/dose
3. Order Heparin 12units/kg/hr. Available Heparin 25,000units/250 mL. The client is 189 pounds. _____ mL/hr

Answers:

1. 125
2. 0.4
3. 10.3