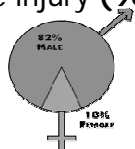


- TREATMENT & CARE OF THE PATIENT WITH COMPLEX NEUROLOGICAL DISORDERS
- SPINAL CORD INJURIES

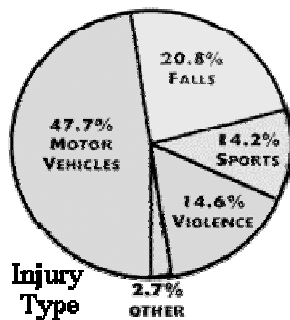


ETIOLOGY

- 14,000 SCI in the U.S.
- 250,000 people with SCI
- <10% die of acute injury (**90% survive**)
- **Male dominated**
- 19 most frequent occurring age at injury
- 60% between 15 – 30 years old



MOST COMMON CAUSES



MECHANISMS OF INJURY

- Hyperflexion
- Hyperextension
- Vertical compression or axial loading
- Excessive rotation

IMMEDIATE CARE & ASSESSMENT

- Respiratory pattern & airway (use jaw thrust)
- Determine circumstances of injury
- Correct immobilization & transport



DEGREE OF INJURY

- **Complete** – permanent loss of motor & sensory function below level of injury
- **Incomplete** – some nerve fibers preserved distal to point of injury

CROSS SECTION OF SPINAL CORD

Three major tracts in white matter

- Corticospinal – voluntary motor
- Spinothalamic – sensory, pain & temperature
- Posterior columns – touch, deep pressure, vibration, two point discrimination & proprioception

FUNCTIONAL LEVELS

- Paraplegia



- Tetraplegia/Quadriplegia

METHYPREDNISOLONE

- Note that this is a treatment option & no longer an evidence based standard of care (2002)
- National Acute Spinal Cord Injury Study (1990)
- High dose bolus within 8 hours of injury
- Continuous infusion for 24 –48 hours
- Doses calculated by patient's weight

SECONDARY INJURY
CASCADE

- Ischemia and edema
- Within 1 hour calcium flood accompanies dying cells
- Free radicals scavenge oxygen from healthy cells
- In 6 to 12 hours secondary wave of immune cells clear injured cells & also destroy live nerve

SHOCK SYNDROMES

- **Spinal shock** – occurs immediately after injury
- **Autonomic dysreflexia** or **hyperreflexia** – occurs after spinal shock resolves in injuries above T-6

SPINAL SHOCK

- Loss of sensation to:
- Pain
- Touch
- Temperature
- Pressure

**SPINAL SHOCK
SIGNS & SYMPTOMS**

- Signs & Symptoms
- Flaccid paralysis
- Bradycardia
- Hypotension
- Occasional paralytic ileus
- Priapism

SPINAL SHOCK

- Loss of reflexes originating from spinal segments below level of injury
- If severe: neurogenic shock
- R/T decreased cardiac output

Neurogenic Shock

- Loss of vasomotor tone (hypotension)
- Generalized vasodilation in PVS
- Interruption of sympathetic NS
- Decreased cardiac output
- Rx with sympathomimetic drugs ie dopamine, atropine for bradycardia

AUTONOMIC DYSREFLEXIA

- Medical emergency – severe hypertension up to 240-300 mm Hg
- Occurs with SCI above T-6
- Exaggerated sympathetic response to noxious stimulus
- Complimentary parasympathetic system unable to balance below level of injury

S/S OF DYSREFLEXIA

- Hypertension
- Bradycardia
- Flushing & diaphoresis above SCI level
- Severe headache
- Nasal stuffiness
- Blurred vision



DYSREFLEXIA MANAGEMENT

- Sit upright to produce orthostatic hypotension (First action)
- Monitor BP every 5 minutes
- Check Foley Catheter for patency or bladder for distension
- Assess for fecal impaction using local anesthetic
- Notify MD

MEDICAL TREATMENT

- Order to irrigate catheter, use only 30 mL
- Obtain order for anesthetic gel (Lidocaine or Nupercaine)
- Medications if needed: nitropaste, nifedipine (Procardia), hydralazine (Apresoline)
- **Key treatment – Prevention!!**

Your patient has a complete spinal cord injury at T- 4, S/P motor vehicle accident (MVA) 5 months ago.

Your assessment yields the following information:

- Sudden-onset pounding headache
- VS: 198/98, 136, 24
- Diaphoretic/flushed in the face
- Cool to touch, especially LEs

What is happening?

NURSING MANAGEMENT ACUTE SCI

- Assume unstable spinal column until "cleared"
- Sensory & motor assessment
- Report any decrease from baseline
- Monitor traction or halo jacket
- Check respiratory patterns & rate
- Assess pin sites & pin care



■What should the nurse immediately do if the tongs or halo jacket is accidentally dislodged?

NOC OUTCOMES

- Respiratory status: ventilation
- Neurologic status: autonomic
- Immobility consequences: physiological

Nursing Diagnoses in Subacute Phase

- Risk for ineffective breathing pattern
- R/T Neuromuscular impairment
- Ineffective tissue perfusion: peripheral R/T interruption of venous flow
- DVT occurs in 80% SCI patients

PULMONARY COMPLICATIONS

- High cause of mortality from SCI
- C4 and higher affects all muscles controlling breathing
- C4 – T6 diaphragm function preserved; different degrees of accessory muscle function
- T6 – T12 ability to cough impaired

MEDICAL PROBLEMS IN SUBACUTE PHASE

- Ineffective secretion clearance
- DVT occurs in 80% of SCI patients
- Pulmonary embolus
- GI hemorrhage

NURSING MANAGEMENT IN SUBACUTE PHASE

- Risk for impaired skin integrity R/T decreased sensation, immobility & vasodilation
- Altered urinary elimination and constipation R/T neurogenic bowel and bladder
- Risk for nutritional deficit R/T hypermetabolism & high caloric needs

POIKILOthermia

- Loss of ability to shiver and retain heat or perspire to release heat
- Body temperature varies with the environment
- Monitor for temperature extremes



BLADDER RETRAINING INTERVENTIONS

- Intermittent catheterization
- Force fluids to 2500 mL/ day
- Fluids to acidify urine
- Limit milk, dairy products, carbonated beverages

URINARY COMPLICATIONS

- Urinary retention
- Urinary tract infections
- Urinary tract calculi
- Lifelong complications for the SCI patient



**BOWEL RETRAINING
INTERVENTIONS**

- Constipation can trigger dysreflexia
- Establish consistent time for elimination 30 min to 1 hour after eating
- High fluid intake & high fiber diet
- Rectal stimulation with or without suppositories
- Stool softeners

DECUBITUS ULCERS

- **Key is prevention**
- Weight shift every 15 min
- 2 hour turning schedule
- Back tilt position 60 - 65 degrees

MALE SEXUALITY & SCI

- Sexual function controlled S 2 – 4
- Men with UMN: 70% with complete injury & 80% with incomplete able to have intercourse
- Reflex erection
- Loss of psychogenic or fantasy responses

MALE SEXUALITY

- Three performance factors
 - Erection
 - Function of parasympathetic NS
 - Requires intact sacral reflexes
 - Ejaculation
 - Function of sympathetic NS
 - Fertility
 - Decreased sperm quality and motility

FEMALE SEXUALITY & SCI

- Lack sensation during intercourse
- Childbearing age – can become pregnant
- Hormonal BCP's increase risk of DVT
- Vaginal delivery possible
- Risk of autonomic dysreflexia in labor

FEMALE SEXUALITY



- Pregnancy
 - Complicated by loss of sensation, increases in BP, and possible precipitation of AD
 - Close monitoring and potential epidural to prevent AD during labor and delivery

MEDICAL PROBLEMS

- Heterotrophic ossification
- Syringomyelia
- Pain, Paresthesias, Hyperesthesias
- Spasticity

NURSING MANAGEMENT OF INTERVERTEBRAL DISC DISEASE

- TRAUMA
- DISEASE
- STRESS
- AGING



SIGNS & SYMPTOMS

- L 4 – 5 pain in hip, groin, post-lateral thigh, dorsal surface of foot
- Difficulty walking on heels
- L 5 – S 1 pain mid gluteal, post thigh, calf down to heel, outer surface of foot
- Difficulty walking on toes

LUMBAR AREA S & S

- Sensory deficits in affected areas
- Diminished or lost reflexes
- Back movement restricted
- Spastic paravertebral muscles
- Difficulty, pain with straight leg raise
- Aggravated by cough, sneeze or strain

CERVICAL S & S

- Stiff neck
- Radiating shoulder pain down arm into hand
- Paresthesias and sensory disturbances in hand

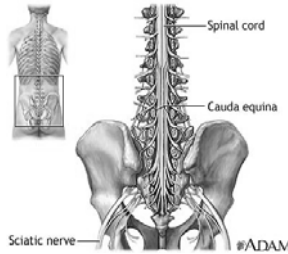
NURSING DIAGNOSES FOR DISC DISEASE

- Acute and chronic pain
- Deficit knowledge
- Risk for perioperative positioning injury
- Disturbed sensory perception



CAUDA EQUINA SYNDROME

- Progressive weakness of lower extremities
- Loss of sphincter control, anal numbness
- Urinary retention
- Notify MD; may require emergency decompression



NOC OUTCOME LABELS

- Pain level
- Knowledge of treatment regimen
- Muscle function and sensation
- Risk control

NIC LABELS FOR INTERVERTEBRAL DISC DISEASE

- Pain management, analgesic administration
- Teaching disease process
- Positioning, intraoperative
- Health education

POST OPERATIVE ASSESSMENT

- CSF leakage
- Acute urinary retention & paralytic ileus
- Arachnoiditis, diskitis
- Laryngeal and tracheal edema with anterior cervical laminectomy
- Donor site for autologous graft for spinal fusion
