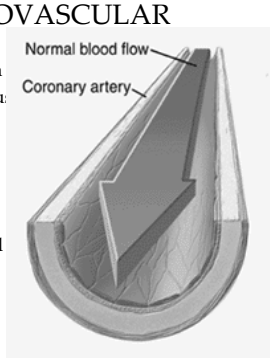
SPINAL CORD INJURY

Possible Complications from Spinal Cord Injury

Lesson 2

CARDIOVASCULAR

- Hypo/Hypertension
- Deep Vein Thrombu
  10-80%, 1/3 PE
- Autonomic
  Dysreflexia, T6 &>
- Sleep Apnea, 25%
  even at IBW
- CAD, 2x as likely all
  else equal



CARDIOVASCULAR CHANGES

- Heart rate & blood pressure are controlled by the Autonomic Nervous System (ANS), which is divided into the Sympathetic (SNS) & Parasympathetic (PNS) system. These systems are impaired from the level of injury down.
- Direct control of the heart & vasculature can be impaired

CARDIOVASCULAR CHANGES

- Hypotension- low BP is common, esp with SCI above T6. If prolonged can require treatment with:
  Compression hose, abdominal binders, reclining W/C, elevating leg rests.
  Refractory cases may require meds such as Ephedrine, Tyramine, Florinef, Proamatine.
  Attendant care may be indicated for some individuals due to severe hypotension

CARDIOVASCULAR CHANGES

- Arrhythmias- can occur in high level tetraplegia, esp during tracheal suction. In such individuals a highly skilled care giver is required. Meds like Atropine may be required or perhaps a pacemaker
- Edema- is common in lower extremities, due to dependency & absent motor activity

CARDIOVASCULAR CHANGES

- Deep Vein Thrombus (DVT)- a blood clot in a large vessel.
  - Occurs in 35-90% of SCI, >cost of hospitalization by 35%.
  - 1/3 will have pulmonary embolus, with ½ dying.
  - After DVT person has 50% chance of re-occurrence of DVT
  - Those who do not have DVT initially 14-20% will have one later in life

AUTONOMIC DYSREFLEXIA

- Life threatening, occurs in 50-98% of tetraplegics, usually at T-6 or higher
- Characterized by: >BP, flushing of skin above the level of SCI, malaise, headache, nasal congestion
- Caused by Noxious stimuli below level of SCI, which must be identified & relieved

AUTONOMIC DYSREFLEXIA

- Tx: education, prevention, Dibenzyline, Procardia, attendant care in refractory cases
- Triggering stimuli: distended bladder, impaction, pressure ulcer, sun burn
- Must R/O more serious causes such as renal calculi, fracture, MI, cholelithiasis, etc.

PULMONARY ISSUSES

- SCI > T-12 will impair respiratory muscles, higher lesions have greater effect
- C-3,4,&5 segments supply the Phrenic n., innervating the diaphragm
- Diaphragmatic breathing, "quad cough", suction, CPT, updraft tx may be required
- Vent dependent people may benefit from Phrenic pacers by Dobelle. Home generators must be considered

PULMONARY ISSUSES

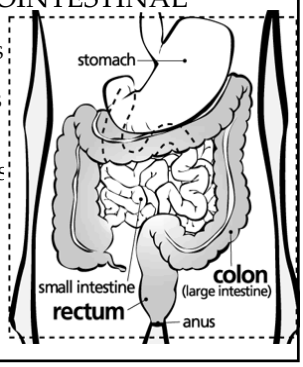
- Sleep apnea occurs in 15-45% of SCI, reported even in those with IBW. Baclofen has been implicated in some
- Sleep disturbances occur in 30-35%
- In addition to the restrictive component, many have an obstructive component responding to bronchodilators
- Chronic hypoventilation can develop with aging, posture changes, gastric distention, wt. gain, & syringomyelia
- Oxandran has been shown to improve diaphragm strength

Gastrointestinal

- Slowing of transient time, increased gastric acid production
- Peptic ulcer disease or gastritis occurs in most SCI
- Hemorrhoids occur in virtually all SCI, rectal tears can result from inappropriate bowel program technique
- Cholelithiasis occurs 3-11X more often

GASTROINTESTINAL

- GASTRIC ULCERS 20%
- CHOLELITHIASIS 11X
- HEMORRHOIDS/ RECTAL FISSURES
- CONSTIPATION
- MEGACOLON

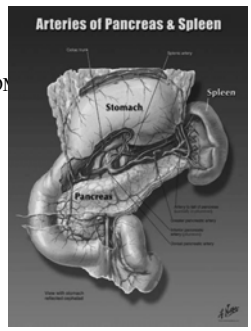


GASTROINTESTINAL

- Neurogenic bowel- may be UMN or LMN. 30 mins to 3 hrs may be required for bowel program.
- Constipation is very common as is incontinence which can be socially, vocationally & recreationally limiting
- During periods of illness even the most independent SCI person will require assistance with bowel care

GASTROINTESTINAL

- SUPERIOR MESSENTERIC ARTERY SYNDROM

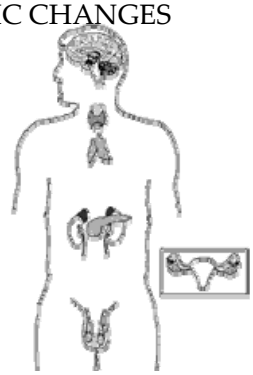


METABOLIC CHANGES

- Dyslipidemia occurs in virtually all SCI, requiring nutritional counseling, exercise,
- AODM is 4X more common in SCI, glucose intolerance is present in 40% of paraplegics, & 50% of tetraplegics
- Lean muscle mass declines, % body fat > 60%
- Anabolic hormones T3, Testosterone, & Insulin like growth factor declines
- Osteoporosis – 50% of bone mass lost in 6 mos, with ongoing loss throughout life

METABOLIC CHANGES

- TESTOSTERONE ¼
- HUMAN GROWTH HORMONE 1/3
- DYSLIPIDEMIAS
- POIKIOTHERMIA
- AODM > 4X
- <IMMUNE FUNCTION



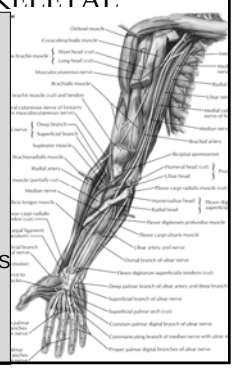
RENAL SYSTEM

- Neurogenic bladder may be UMN or LMN, spastic or flaccid.
- Detrusor-sphincter dyssynergia can lead to many complications including renal failure
- GU f/u care will include UAs, C&S, renal US, cystoscopy, etc
- UTI is common as is calculi
- With indwelling foley bladder ca is 25X more likely with mortality 70X more likely

MUSCULOSKELETAL

OVERUSE SYNDROMES
ROTATOR CUFF IMPINGMENT
EPICONDYLITIS
TENDINITIS
BURSITIS
<FUNCTION & >PAIN
ENTRAPMENT NEUROPATHY
70-86% EXPERIENCE THESE
SOME AS EARLY AS 5 YEARS
UE PAIN 2X AS COMMON IN FEMALES

Davidoff, 1991
Pentland, 1991



MUSCULOSKELETAL

- 40% will have fractures, many will result in non-union
- Heterotopic ossification – HO occurs in 20-30%, ectopic bone formation. Most common in hips, knees, shoulders, elbows
- HO can cause skin breakdown, or ankylos a joint. 50% re-occurrence
- Tx: ROM, PT, meds (Indocin, Didronel), lab test, x-rays, bone scan, & surgery.

MUSCULOSKELETAL

- Overuse syndromes – bursitis, rotator cuff impingement, etc occur in >75%
- UE pain 2x as common in females, & occurs earlier after SCI onset
- Entrapment neuropathies 75-85%, beginning as early as 5 yrs post SCI
- Living without assistance & inappropriate equipment increases repetitive use injuries
- Poikiothermia- inability to control temperature

SPASTICITY

- Involuntary spasms or muscle contraction, can cause skin breakdown, contracture, & interfere with sleep or function
- Made worse with noxious stimuli: tight clothing, ingrown toe nail, fracture, skin irritation, etc
- Tx: ROM, PT, hydrotherapy, weight bearing, meds (Baclofen, Xanaflex, valium), motor point blocks, Botox, intrathecal Baclofen pump, rhizotomy, tendon lengthening

DECUBITUS ULCER

- Perhaps the most costly complication, annual incidence of 23-30%
- Grade: I is redness & induration, II is superficial breakdown, III is into subcutaneous tissue, IV is into muscle, V extension into adjacent structures
- Tx: education, equipment, nursing service, dressing supplies, nutrition eval, surgery
- Decubiti leave scar making future breakdown more likely