HEALTH MAINTENANCE IN SPINAL CORD INJURY

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Emphasis on neurological assessment and impact on functional outcome

Emphasis on interventions to improve functional outcome: rehabilitation therapies, tendon/nerve transfers, late complications impacting function, secondary conditions, equipment and modifications

However, there is a large body of research regarding the physiological changes after SCI and their impact on aging and health risk

It is this aspect of SCI medicine that we will explore today
Recent hospitalizations, infections or new medical diagnoses that have been made since last visit

New problems or changes in existing medical problems

Changes in function or activities of daily living

Updates in medications and allergies

A review of symptoms/systems

Changes in mood, relationships or employment status

Changes in tobacco, alcohol or drug use

Updates of family medical problems

A physical examination

ANNUAL EVALUATION BY AN SCI MEDICINE SPECIALIST
Skin examination
Gynecological and breast cancer screening
Colon cancer screening
Changes in Neurological Function

- Peripheral
  - Carpal tunnel syndrome
  - Ulnar neuropathy
- Cervical and Thoracic
  - Cervical spondylosis myelopathy
  - Radiculopathy due to spondylosis
  - Syrinx
- Lumbar
  - Lumbar epidural fibrosis
  - Lumbar stenosis
37 year old T11 ASIA A Spinal Cord injury

- Bilateral hand numbness
  - Worse at night and first thing in the morning
  - Worse with hand cycling
- Left lower abdominal pain and left leg spasticity
  - Worse with prolonged sitting
  - Improved with time in the standing frame
55 year old with old thoracic disc herniation and myelopathy with progressive lower extremity spasticity and weakness. Baseline examination with pin level at T6, intact vibration sense, 3+ reflexes without clonus nor spasticity, 5/5 strength.
Lower extremity reflexes are 3+ with sustained left ankle clonus and bilateral extensor plantar responses. Ashworth scores are 1+ at the hips bilaterally, 2 at the quadriceps, 1 at the hamstring and right ankle, 1+ at the left ankle.

Pin sensation is a T6 pin level bilaterally with patchy decreased pin sensation in the right lower abdomen, markedly decreased pin sensation below the knee on the right leg compared to the left with intact vibration sense bilaterally.

Strength is 4+ right lower extremity, 4 to 4- on the left.
48 year old woman with a L2 ASIA B spinal cord injury from a motor vehicle accident with progressive left leg pain with activity
CHANGES IN MUSCULOSKELETAL FUNCTION

- Shoulder Pain
- Wrist/hand Pain
- Injuries
- Treatments that might impact MSK function
  - Steroids for asthma, rheumatological conditions
  - Statins
57 year old T6 ASIA spinal cord injury 20 years previously

Presents with right shoulder pain and weakness after a near fall during a transfer when her wheelchair brake malfunctioned
CARDIOVASCULAR DISEASE

- Modifiable: Tobacco use, weight, hyperlipidemia, hypertension, hyperglycemia
- Increased risk of metabolic syndrome and CAD
  - Elevated homocysteine levels: associated with vascular disease
  - Elevated C-reactive protein levels: atherogenesis
  - Greater atherosclerotic burden
- Changes in heart chamber structure and function
  - Impacted by alterations in autonomic control
  - Impacted by lower peak exercise potential
METABOLIC SYNDROME RISK AND MONITORING

- LIPID PANEL
- THYROID STIMULATING HORMONE
- HgbA1C
- Testosterone
Impact of neuromuscular respiratory failure
- Age related loss of volume and flow

Impact of expiratory function loss
- Neurological levels T6 and above

Infection Risk
- Pneumovax
- Flu vaccination

Impact of sleep disordered breathing
- Incidence in cervical SCI 60%, up to 1/3 have central apnea as well
- Incidence in thoracic SCI 20%
- Incidence present at the time of injury (stable over the first year)
Respiratory Function Recommendations

- Spirometry with aging
- Sleep apnea testing
  - polysomnography
  - nocturnal trans-cutaneous oxygen and carbon dioxide measurements
- Treatment for expiratory dysfunction
  - Assisted cough
  - Cough assist machine (insufflator-exsufflator)
  - Mechanical secretion mobilization
    - Chest PT
    - Vibration
    - Vest
OBSTRUCTIVE VS. CENTRAL APNEA TREATMENT

- Obstructive
  - Create clearance past area of proximal obstruction
  - Positive pressure

- Central
  - Address hypoventilation, which is not possible with pressure alone
  - Must have a back up rate to account for hypoventilation
42 year old

- 8/24/17 developed neck and upper back tingling radiating down the LUE after turning left
- 8/25 difficulty climbing stairs
- 8/26 worsening weakness and SOB
- Admitted and intubated
- MRI: T2 hyperintensity at C1-5

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RENSAL FUNCTION MONITORING

- Yearly serum creatinine as a proxy for renal function
- Screening renal ultrasound for hydronephrosis
- Urodynamics to evaluate for bladder compliance and resultant risk to renal function
- Monitor frequency of urinary tract infections
  - Proxy for detrusor sphincter dyssynergia
  - Proxy for renal/bladder stones
  - Indwelling catheter
  - ISC/CIC technique
- Bladder cancer monitoring with cystoscopy
- Vitamin D monitoring
- Monitor calcium consumption and supplement as needed
- Bone density monitoring: baseline and every five years
- What we know about weight bearing benefits and risk is very limited
BONE HEALTH TREATMENT

- Biphosphonates
  - Inhibit osteoclast activity by blocking the farnesyl diphosphate synthase in the mevalonate pathway.

- Selective estrogen receptor modulator (SERM)
  - Raloxifene

- IgG2 monoclonal antibody with affinity and specificity for human RANKL (receptor activator of nuclear factor kappa-B ligand)
  - Denosumab

- Statins
  - Inhibit osteoclastic activity by way of the mevalonate pathway by blocking HMG-CoA reductase
Increased risk in patients taking medications that negatively impact saliva production
  - Anti-cholinergic
Increased risk in patients with tube feeding and reflux
Increased risk in patients on ventilator
QUESTIONS?