

PRACTICE GUIDELINE

Effective Date: 5-21-04

Manual Reference: **Deaconess Trauma Services**

TITLE: TRAUMATIC QUADRIPLEGIA OR PARAPLEGIA

PURPOSE: To define diagnostic approaches to spinal cord injuries. To define early therapeutic intervention strategies for spinal cord injuries.

DEFINITIONS:

1. Traumatic quadriplegia: Any injury associated with a spinal cord or nerve root deficit not involving the cranial nerves above and including C8, T1 roots.
2. Traumatic paraplegia: Any injury associated with a spinal cord or nerve root deficit below and including T2.
3. Complete: Any spinal cord injury associated with a complete motor and sensory deficit below the level of the injury.
4. Incomplete: Any sensory or motor sparing below the level of injury including perianal sensation.

GUIDELINES:

1. Follow the ABC's when assessing patient.
2. Perform a complete neurological exam looking for neurological deficits and identifying the level of the deficit.
3. Maintain spinal precautions.
4. Obtain X-rays of the C-spine, thoracic, and lumbosacral injury according to protocols.
5. If quadriplegia or paraplegia are noted, perform a bulbocavernosus reflex test:
 - a. Male: pull on penis while examining for an increase in rectal tone.
 - b. Female: pull on Foley catheter while examining for an increased rectal tone.
 - c. If this reflex is present, then spinal shock is not occurring and injury will usually not improve.
 - d. If this reflex is absent, then spinal shock may be occurring and ultimate outcome of injury is masked.
 - e. Document presence or absence of bulbocavernosus reflex.
6. With any injury referable to the spinal cord, start the "steroid protocol" per physician order:
 - a. SoluMedrol 30 mg/kg, as slow IV bolus (begin as early as possible) within eight hours of injury.
 - b. SoluMedrol 5.4 mg/kg, for the next 23 hours.
 - c. Continue the protocol even if there is complete neurologic improvement.
7. Consult Neurosurgery immediately.
8. Neurogenic shock may occur with injuries down to T4-6; be sure to rule out any causes of shock.
 - a. Place Foley and monitor urine output.
 - b. Follow frequent blood pressures.
 - c. If patient has SBP <90 mmHg or MAP <65mmHg and urine output < 50ml/hr and hemorrhagic shock has been ruled out (by CXR, DPL or CT

Scan of the abdomen), consider the following steps (per physician orders) until improvement occurs:

- i. Administer 2000 ml IV fluid.
 - ii. Start dopamine at 5mcg/kg/min; continue fluid resuscitation as necessary.
 - iii. If no response, increase dopamine to 10 mcg/kg/min.
 - iv. Insert pulmonary artery catheter to assess filling pressures and cardiac index.
 - v. Consider phenylephrine starting at 30mcg/min if fill pressures and cardiac index are satisfactory.
9. For quadriplegia or paraplegia with potential pulmonary problems:
- a. Nearly all patients with a C-5 or higher neuro deficit will require intubation.
 - b. Obtain a baseline Force Vital Capacity and Negative Respiratory Force on admission and every 6 hours for 24 hours, then discontinue.
 - c. Assess vital capacity: if less than 1000 ml (or 10ml/kg), consider intubation.
 - d. Assess ability to clear secretions: consider intubation if secretions cannot be cleared spontaneously or with quad cough maneuver.
 - e. Closely monitor in ICU or step down unit for the first 24 hours, with good pulmonary toilet.
 - f. If there is a question about retention of secretions or development of atelectasis in the first 24 hours, intubate.
10. Provide DVT prophylaxis (see Practice Guideline: DVT/PE Prevention and Prophylaxis)
11. Request full rehabilitation services consult on admission.

Table 1. Major Motor Levels

Level	Muscle Group	Action	DTR
C5	Deltoid, spinati	Abduction of shoulder; External rotation of arm	
C6	Biceps, brachialis	Flexion of elbow	Biceps jerk
C7	Triceps, wrist extensors	Extension of elbow, wrist	Triceps jerk
C8	Intrinsic hand muscles	Abduction, adduction of fingers	
L2,3	Iliopsoas	Hip flexion	
L4	Quadriceps	Extension of knee	
L5	Tibialis anterior and posterior extensor, halluces longus	Dorsiflexion of the foot and bit toe	Knee jerk
S1	Gastrocnemius	Plantar flexion of foot	Ankle jerk
S4-5	Anal sphincter	Voluntary contractions of anal sphincter	

Table 2. Major Sensory Levels

C4	
C5	Clavicle
C6	Deltoid region
C7	Radial forearm and thumb
C8	Middle finger

T1	Fifth finger
T5	Medial, proximal arm
T7	Nipples
T10	Costal margins
T12	Umbilicus
L3	Inguinal ligament
L4	Anterior thigh
L5	Medial aspect of knee
S1	Lateral calf, dorsum of foot, big toe
S2	Lateral foot, fifth toe
S3,4	Buttocks, perianal region

Table 3. Segmental Reflexes

Reflex	Level
Biceps	
Triceps	C6
Upper Abdominal*	C7
Lower Abdominal*	T7-T10
Cremasteric*	T10-T12
Knee jerk	L1
Posterior tibial jerk	L4
Ankle jerk	L5
Bulbocavernosus (1)	S1
Anocutaneous (2)	S2-4
	S4-5

* Cutaneous reflexes: decreased in upper motor neuron lesion.

- 1 Contraction of bulbocavernosus muscle after stroking dorsum of glans penis.
- 2 Contraction of anal sphincter after stroking the perineal skin.

REFERENCES:

- TRAUMA NURSING CORE COURSE, Emergency Nurses Association, Fifth edition, 2000.
- Deaconess Trauma Guideline Manual, CERVICAL SPINE CLEARANCE.
- Deaconess Emergency Department Policy & Procedure Manual, SPINAL CORD INJURY FLOWSHEET.
- Deaconess Trauma Guideline Manual, NECK IMMOBILIZATION FLOWCHART.
- Deaconess Nursing Procedure Manual, No. P-16, PRESSURE ULCER: PREVENTION, ASSESSMENT, TREATMENT.

REVIEWED DATE	REVISED DATE
JAN 05	8-17-07
JAN 06	JAN 08
JAN 07	