

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 the 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 ATLS protocol 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 CTs of the Cervical, thoracic, and lumbar spines for any patient with a neurologic deficit
5. If patient has a spinal fracture that is potentially an unstable fracture and hasn't been seen by neurosurgery for plan of care, or patient has a motor and/or sensory deficit, or a possible SCIWORA, patient should be admitted as a stepdown or higher level of care (ICU)
6. Steroids are no longer indicated for spinal cord injury
7. Consult Neurosurgery immediately
8. If patient has quadriplegia or paraplegia at T6 level or above and hemodynamic instability, rule out hemorrhagic shock with Chest X-ray, Pelvis X-ray, FAST, while administering bolus crystalloid and/or blood
 - a. Place Foley and monitor urine output
 - b. Once hemorrhagic shock is ruled out, start vasopressors (Epinephrine or Norepinephrine) and titrate to MAP>85
9. For quadriplegia or paraplegia consider possibility of respiratory decline:
 - a. Obtain a baseline Force Vital Capacity and Negative Respiratory Force on admission and every 6 hours for 24 hours
 - b. Consider elective intubation for increased work of breathing, hypoxia, or secretion management
 - c. Closely monitor in ICU and promote pulmonary toilet
10. Provide DVT prophylaxis (see Practice Guideline: DVT/PE Prevention and Prophylaxis)
11. Request full rehabilitation services consult on admission.

Table 1. Major Motor Level⁶

Level	Muscle Group	Action	DTR
C5	Deltoid	Abduction of shoulder	Strike deltoid
C6	Biceps, brachialis	Flexion of elbow	Biceps jerk
C7	Triceps, wrist extensors	Extension of elbow, wrist	Triceps jerk
C8	Intrinsic hand muscles	Make a fist	*
T1	Intrinsic hand muscles	Abduct adduct fingers	*
L2	Iliopsoas	Hip flexion	*
L3	Quadriceps	Extension of knee	Knee jerk
L4	Hamstrings	Flex knee	*
L5	Tibialis anterior and extensor hallucis longus	Dorsiflexion foot and big toe	Plantar reflex
S1	Gastrocnemius	Plantar flexion of foot	Ankle jerk
S2-S4	Anal sphincter; bulbocavernosus	Voluntary contractions of anal sphincter	*

* usually evaluated by Neurology, neurosurgery, occupational therapy and/or physical therapy

Table 2. Major Sensory Levels⁶

Level	Sensory
C1	None in 90% of population
C2	Scalp
C3	Neck
C4	Shoulder
C5	Deltoid (shoulder pads)
C6	Thumb
C7	Middle finger
C8	Little finger
T1	Medial forearm
T2	Medial (proximal) arm
T4	Nipple
T8	Costal margin
T10	Umbilicus
T12	Inguinal ligament
L1, L2	Anterior thigh
L3	Medial aspect of knee
L5	Lateral calf, dorsum of foot, big toe
S1	Lateral foot, fifth toe
S3, S4	Ischial tuberosity
S4, S5	Buttocks, perianal region

Table 3. Segmental Reflexes⁷

Reflex	Level
Biceps	C5 – C6
Triceps	C6 – C7
Upper Abdominal *	T7 – T10
Lower Abdominal *	T7 – T10
Cremaster *	L1 – L2
Knee jerk	L3 – L4
Posterior tibial jerk	L4
Ankle jerk	S1
Bulbocavernosus ¹	S2 – S4
Anocutaneous ²	S2 – S4

* 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:

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- ❖ Deaconess Trauma Guideline Manual, NECK IMMOBILIZATION FLOWCHART.
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