Neurorehabilitation

Resident Level: PGY-3 or PGY-4

Goals & Objectives

I. Knowledge

Understanding the mechanisms of neuronal compensation for injuries and regeneration of the nervous system; somatotrophic reorganization: alterations in sensory receptive fields following deafferentation and amputation; compensatory alterations in metabolism of contralateral brain as evidenced from PET studies following stroke.

Familiarity with research on the use of fetal CNS tissue in transplantation paradigms for the treatment of Parkinson's disease, the role of GDNF and other growth factors.

Understanding the pathophysiology of acute spinal cord trauma, and the rationale of treatment protocols employing methyl prednisone, GM-1, and trilazad mesylate; research data on (a) the role of Schwann cell-derived (NGF) and other trophic factors (CNTF, BDNF, NT3), in facilitating sprouting; (b) the role of oligodendrocyte- and myelin-associated inhibitors of neurite growth contributing to an inhospitable milieu and rendering the CNS non-conducive to regeneration; (c) transplantation strategies employing somatic gene cell transfer of trophic factors and the use of antibodies to growth inhibitors to enhance regeneration.

Understand the concept of post-polio syndrome and related research data; the pathophysiology of ALS and anterior horn cell degeneration; studies on CNTF and other trophic factors.

Gain insights into the pathophysiology of pain and spasticity and the various approaches (pharmacological, non-pharmacological, and TENS therapy) towards their amelioration.

Understand the concept of diaschisis and PET scan studies investigating such processes; the role of mitochondrial histological dysfunction and endogenous transmitters (GABA) mediating functional diaschisis following stroke; the role of cytokines and excitotoxic amino acids in reperfusion injury after stroke, and effect of commonly used drugs (anticonvulsants, antihypertensive agents, and benzodiazepines) in potentiating post-stroke diaschisis; experimental studies on amphetamine for facilitating functional stroke recovery.

Learn basics of computational neurosciences and an understanding of the advances in bioengineering techniques for developing prosthetic devices to compensate for neurological disabilities. This will include discussions on functional electrical stimulation (FES), the central pattern locomotor (gait) generator, reciprocating gait orthosis (RGO), the Freehand hand grasp device, and the VOCARE implantable bladder control device.

II. Practice Skills

Perform and document a complete history and examination on patients (stroke, spinal injury and closed head injury) to ensure accurate diagnosis of cause of disability, with review where the disability changes.

Establish the mechanism and severity of disability; become familiar with functional assessment and functional independent measure (FIM) scores; establish protocols to relieve symptoms (pain, depression); to maintain or improve function (spasticity, orthoses, exercises); and to prevent deformity (splints, physical therapy, surgery if indicated).
Work with physical and occupational therapists in learning to identify and quantitate neurological disabilities and design appropriate rehabilitative therapies designed to maximize independence with activities of daily living (ADLs).

Work with speech therapists to evaluate speech deficits; evaluate for aspiration risks; perform modified barium swallow procedures.

Participate in weekly interdisciplinary rehabilitation case conferences for integrated planning of treatment strategies for managing disabilities and to establish long-term goals.

Participate in family conferences to establish a prognosis and explain implications of disease to patient and relatives; assist the patient and family to acquire knowledge, skills and attitudes necessary to minimize handicaps.

Participate in discharge planning; meet with the social worker for liaising with other health, community, statutory, and voluntary services to ensure management plan is followed successfully and audit the outcome.

III. Attitudes and Values

Professional demeanor and compassion when examining patients, realizing that people with disabilities are people first, and those patients with disabilities have abilities too.

Being compassionate; avoiding use of words which imply pity for disabilities, and emphasizing abilities rather than disabilities; taking care not to perpetuate negative and patronizing stereotypes, and using more appropriate and positive terms for disabilities.

Being professional, sensitive and compassionate when interacting with family members.