Objectives

• Provide an bird-eye overview of some of the common therapeutics modalities used in Neurology
• Familiarize with some of the interventions less likely to be encountered in other clinical areas

General

• Patient education and counseling is paramount
• Teach to enhance treatment compliance
• Genetic counseling can be difficult
• Withdrawal of offending agent, when possible
• Specific measures for each condition

Acute Stroke

• Intravenous tPA (tPA for Acute Stroke NEJM 1995)
  – Used in the first 3 hours of onset
  – Please, review the contraindications
  – Used in selected cases after 3 hours of onset
• Aspirin – start early when no contraindication (CAST Lancet 1997)
Stroke Prevention

- ACEI + indapamide – NNT ~11
  PROGRESS Lancet 2001
- Statins – NNT ~35
  - PROGRESS Lancet 2001
- Antiplatelet (single agent) – NNT ~30
  - ATC Metaanalysis BJM 2002, CHARISMA NEJM 2006
- β-blockers, ARBs
  - JNT JAMA 2003, LIFE JAMA 2002
- Endarterectomy, stent
  - NASCET NEJM 1998, SAPPHIRE NEJM 2004

Epilepsy

- Phenytoin, valproic acid, carbamazepine
- Lamotrigine (Lamictal), topiramate (Topamax), levetiracetem (Keppra), felbamate, gabapentin
- Phenobarbital, primidone
- Rectal diazepam

Some Side Effects of AEDs

- Phenytoin: Ataxia, diplopia, gingival hyperplasia, fever, SJS
- Carbamazepine: hyponatremia, SIADH, SJS, ataxia
- Phenobarbital: sedation, behavioral disturbance, peripheral edema, SJS
- Valproic acid: tremor, hepatic dysfunction, hair loss, weight gain, pancreatitis
- Lamotrigine: skin rash
- Topiramate: renal stones, glaucoma, weight loss

Status Epilepticus

- Lorazepam (or diazepam)
- Phenytoin or phenobarbital
- Valproic acid
- Pentobarbital (coma)
- Propofol
- General anesthesia

Parkinson’s Disease

- Sinemet (L-dopa + carbidopa)
- Pergolide, Mirapex, Comtan
- Anti-cholinergics (beztropine – Cogentin)
- Avoid anticholinergics (in some)
- Avoid dopamine blockers (eg droperidol, metoclopramide)

Anti-psychotics for PD

- Clozapine
- Risperdal
- Olanzapine
- Seroquel

- Other: pallidotomoy, thalamotomy, DBS, fludrocortisone

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**Essential Tremor**
- Propranolol
- Primidone
- Gabapentin
- Topamax
- DBS

**Dementia**
- Keep patient safe
- Cholinesterase inhibitors: Donezepil (Aricept), Nemantine (Namenda), Rivastigmine (Exelon), Galantamine (Reminyl)
- Help the care-giver

**Migraine**
- Abortive
  - NSAIDS, triptan, DHE, phenergan, metocloramide
- Prophylactic
  - Propranolol, nadolol, amitriptyline, nortriptyline, topamax, verapamil, depakote, indomethacin (cluster headaches)

**Trigeminal Neuralgia**
- Carbamazepine
- Amitryptyline, imipramine, phenytion, valproic acid, gabapentin
- Surgery – decompress nerve from artery

**Guillain-Barre**
- IVIG or PLEX
- Supportive therapy

**Myasthenia gravis**
- Always look for etiology of decompensation: infections, drugs
- Pyridostigmine (Mestinon), requires 3-4 hour dosing
- Steroids, azathioprine (Imuran), cyclosporine, PLEX, IVIG
- Thymoma surgery
  - Does this Patient have Myasthenia? JAMA 2005
**IVIG and PLEX**

**Some Indications for IVIG**
- Gullian-Barre Syndrome
- Myasthenia Gravis
- Demyelinating Polyneuropathy
- Goodpasture’s Syndrome
- TTP, HELLP
- Hyperviscosity Syndrome (e.g., Multiple Myeloma)
- Paraneoplastic Syndromes (e.g., Lambert-Eaton)
- Vasculitis

**Some Indications for PLEX**
- Gullian-Barre
- CIDP
- Multiple sclerosis
- TTP, HELLP
- Hyperviscosity syndromes
- Microangiopathies
- Poisoning, like digitalis
- Pemphigus

**Infections**
- Give drugs in high-enough dose for CNS penetration
- Antibiotics: ampicillin, ceftriaxone,
- Acyclovir for (suspected) HSV infections, until PCR back
- Steroids before or with first dose of antibiotics

**Increased ICP**
- Position of the patient
  - Head up 30 degrees, in neutral position
- Nothing compressing the jugular veins
- Mannitol
- Hypertonic saline
- Pentobarbital
- Steroids for tumor-related edema
- Hypothermia
- CSF drainage

**Decreased CPP**
- IV saline, normovolemia
- Pressors
  - Phenylephrine
  - Norepinephrine
- Inotropes
  - Dobutamine
  - Milrinone

**Other**
- Heparin: cerebral venous thrombosis
- Steroids: acute spinal cord injury, vasculitis, sarcoidosis, auto-immune,
- Immunomodulating agents: vasculitis
- Zoster: famcyclovir, acyclovir
- Post-herpetic neuralgia: amitryptiline, carbamazepine, phenytoin, gabapentin
Spasticity

- Physical therapy, orthotics
- Liorisal (Baclofen), Tizanidine (Zanaflex), diazepam, dantrolene, clonidine
- Botox
- Surgery
- Intrathecal baclofen

Neuropathy

- Amitriptyline, gabapentin, phenytoin, carbamezepine
- Simple analgesics – acetaminophen
- TENS
- PLEX for CIDP
- Orthotics
- Surgical corrections

Multiple Sclerosis

- Acute attack
  - Methylprednisolone IV
- Management of symptoms: fatigue, weakness, visual impairment, bladder, depression, pain, spasticity
- Long-term management for relapsing-remitting
  - β-interferon, glatiramer, mitoxantrone

CNS Stimulants

- Mehtylphenydate: for ADHD, post stroke or TBI apathy
- Adderall: for ADHD
- Modafinil (Provigil): for narcolepsy
- Amantadine: for post-TBI apathy

Comfort Care – End-of-Life

- Simplify therapy
- Keep IV access TKO
- Keep Foley catheter
- Provide comfort: physical, mental, spiritual – to patient and family
- Enhance comfort: re-positioning, stool impaction, avoid physical restraints
- Call pastoral care and social worker, as needed and after discussing with patient and/or family
- Liberalize visitation

- Ethical Care at End of Life CMAJ 1998
- Pharmacological CNS Stimulants Meds in TBI and nonTBI Med Science Monit 2000
- Management of Adult Spasticity CMAJ 2003
- Advances in Neuropathic Pain Arch Neurol 2003
- Advances in Neuropathic Pain Arch Neurol 2003
- Diagnoses and Management of MS Ann Fam Phys 2004
Pharmacology at end-of-life

- Pain control
  - Opiates/opioids
- Anxiety – benzodiazepines (long acting)
- Delirium – haloperidol (± diphenhydramine)
- Secretions – glycopyrrolate or atropine
- Oxygen – only for comfort, not for life prolongation
- Other: anti-seizure meds

Thank you.
Questions?