Spasticity Management: Pharmacological treatment

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Plan

Devising a treatment plan
- Impact of spasticity on the person
- Assessment

Interventions and team management
- Overview of treatments
- Oral drugs
- (Botulinum toxin and Intrathecal baclofen)
- Intrathecal phenol
- Surgery

Long term follow up
Impact of Spasticity and Spasms

Negative

- Washing
- Feeding
- Dressing
- Relationships
- Bladder & Bowel
- Posture
- Sexual activity
- Mood
- Safety

Positive

- PWS & UMN Syndrome
- Likes movement associated with spasms
- Mobility
- Transfers
- Body Image
- Maintains muscle bulk
- Maintains vascular flow, prevent DVT
- Uses spasms to assist mobility

Remember spasticity can also be useful.
Spasticity Assessment

- Information gathering
- MDT Outpatient clinic - ICP
  - Who? Dr, PT, Nurse.....
- Effect of spasticity, spasms on daily activities incl sleep, mood, participation
- Assess patient expectations
- Look for trigger factors
Triggers and noxious stimuli

- Skin
- Bowels
- Bladder
- Splints
- Orthotics
- Pain, skin
- Seating & positioning
Measures

- Tone - Ashworth (1964)
- Range of movement - Goniometry
- Spasm scale - (Penn et al 1989)
- Visual analogues of pain, comfort, leg stiffness
- Description of position in W/C- photos
- MAIN PROBLEM

GOAL
Goal

Our Goal for the Week
Options for Spasticity Management

- **MILD SPASTICITY**
  - Oral Medication
  - Inpatient Rehabilitation
  - Focal Treatments
  - Intrathecal Baclofen
  - Intrathecal Phenol

- **SEVERE SPASTICITY**
  - Inpatient Rehabilitation
  - Inpatient Rehabilitation
  - Inpatient Rehabilitation

- **Surgical Options**

Primary → Teamwork → Secondary

Intermediate
Spasticity Management

- Oral Medication
- Botulinum Toxin
- Inpatient Rehabilitation
- Inpatient Options
- Intrathecal Baclofen
- Intrathecal Phenol
- Surgical Options

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Individualised Treatment Plan

- **Education**
  - What is spasticity?
  - Contribution of spasticity to current problems/function

- **Management of trigger factors**

- **Physical management programme**
  - Positioning, Seating, Standing, Stretches, Strengthening

- **Pharmacological treatment**
Physical Intervention - Aims

- Remove physical trigger factors
- Determine spasticity needed for function and what is not
- If needed → prevent contracture and overuse of spasticity
- If not needed → re-educate movement patterns
- Maximise use of weakened muscles
- Maintain/improve soft tissue length
Pharmacological Therapies

- **Generalised**
  - Baclofen, Tizanidine, Dantrolene, Benzodiazepines, Gabapentin

- **Focal**
  - Botulinum toxin
  - Regional nerve blocks

- **Intrathecal**
  - Baclofen
  - Phenol
Issues with Oral Drugs

- Optimisation of effects
  - Timing, drug choice
- Side effects
- Blood monitoring
- Exposing weakness
  - Trunk and lower limbs
- Mechanism for monitoring effect and adjusting dose

Remember- the aim is to improve function and minimise complications, not simply to reduce spasticity
Optimisation

Getting the most out of the drugs

**Timing**
- Tablets on waking. Not with breakfast
- Adjust to activities eg. Car travel, work patterns, therapy, sexual activity

**Drug choice**
- Take advantage of other drug actions
  - Clonazepam and sedation- for nocturnal spasms
  - Gabapentin- for neuropathic pain

**Mechanism for monitoring effect and adjusting dose**
- Patient and carer education, treating therapists, GP
Combining drugs

Start low and go slow

- **Start first choice drug**
  - Increase according to effect or tolerance
  - Stop titration when desired effect achieved or side effects occur
  - If no effect at full tolerated dose, withdraw

- **Add in 2nd drug**
  - Repeat process
Baclofen

- GABA derivative (inhibitory neurotransmitter)
- Plasma \( \frac{1}{2} \) life 3-4 hours
- Dose 5mg od- 40mg tds
- Side effects common; drowsiness, confusion, dizziness, weakness
- Avoid abrupt withdrawal
Tizanidine

- Equivalent to baclofen and diazepam in comparison studies but less side effects
- $\alpha$ adrenergic antagonist; reduces excitatory spinal cord transmission
- Side effects - drowsiness, dry mouth
- LFT’s necessary - transient hepatotoxicity may occur
Dantrolene

- Acts peripherally on skeletal muscle by inhibiting release of calcium ions from the sarcoplasmic reticulum
- Reduces reflex > voluntary contractions
- Plasma ½ life 9 hours (25mg- 100mg qds)
- Side effects- drowsiness, weakness, GI symptoms
- LFT’s necessary- hepatotoxicity may occur
Benzodiazepines

- Potentiation of GABA action post-synaptically
- Inhibition of descending excitatory pathways
- Role limited by side effects; drowsiness and dependence
- Clonazepam useful for nocturnal spasms
Gabapentin

- Short term reduction in spasticity demonstrated in placebo controlled trials
  - Patients reported improved ADL’s, sleep, mood and appetite
- Potentiation of GABA action
- Side effects; fatigue, reduced concentration, drowsiness and unsteadiness
What if the drugs don’t work?

Review trigger factors and physical management programme before escalating therapy

Other treatment options:
- Focal treatments
  - Chemical neurolysis or botulinum toxin
- Intrathecal baclofen
- Intrathecal phenol
- Surgery
Intrathecal Phenol

- Protein coagulation & necrosis
- Axonal degeneration
- Indiscriminate destruction of motor and sensory fibres
Selection Criteria

- Severe lower limb spasticity
- Oral Medication, physiotherapy, nursing no longer effective
- ITB not appropriate
- Bladder & bowel dysfunction with effective management programme in place
- Aware of potential sexual dysfunction
- Sensory impairment of lower limbs
Efficacy

25 patients

- Goals of treatment:
  - Increase ease of care
  - Comfort
  - Positioning in bed or wheelchair

- Marked reduction in tone, pain, spasm intensity and frequency. Increased ease in positioning, hoisting, hygiene and dressing

Aspects of IP Service

- Spasticity assessment & measures
- Expert injector
- Local anaesthetic trial as inpatient
- Nursing, physio and Wh/C service follow up
- Repeat injections may be necessary
Lumbar spinal anatomy

Motor nerves

Sensory nerves

Cerebrospinal fluid
Right lateral position

- Front

- Sensory nerves

- Motor nerves

90°
Lumbar puncture
Modified right lateral position

30°

Front
Insertion of Phenol
End Result

- Damaged motor nerve
Reserved for severe cases

**Peripheral Neurotomies**
- Microsurgical technique; preservation of ~1/4 fibres prevents excessive weakness and wasting

**Selective Dorsal Rhizotomy**
- Predominantly children with cerebral palsy
- Selection of rootlets divided

**MicroDREZotomy** *(DREZ- dorsal root entry zone)*
- Microsurgical incisions, 2-3mm in depth, 35-45 degree angle
- Useful for pain
Consider only after spasticity treated and goal orientated

- **Tendon lengthening**
  - Aim; to achieve a more functional position of limb

- **Tendon transfer**
  - Used to normalise articular orientation
  - E.g. distal tendon of peroneus brevis onto the tibialis anterior for equinovarus foot

- **Osteotomies**
  - Correct bony deformity from abnormal childhood growth

- **Articular surgery (arthrodesis)**
  - Last resort and never in growing children
MDT Management

Nurses
Skin, Bladder, Bowel
Drug education
Positioning

PT
Standing, Positioning, Stretching, Exercise programme, Splinting, FES, Monitoring treatment

PWS / Carer
Monitor aggravating factors
Exercise / stretching
Monitor drug effectiveness

OT
Adaptations
Wheelchair
Positioning
Splinting
Role/ function

DR
Timing of assessments & treatments
Drug prescribing & evaluating

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Acknowledgements

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To you all for listening....

Any questions?