

Drugs to Treat Muscle Spasms

1. Muscle Spasms

- Involuntary contraction of a muscle or muscle group
- Causes pain and decreased function
- Causes may be epilepsy, hypocalcemia, acute and chronic pain syndromes, trauma
- Drug therapy- may include analgesic anti-inflammatory agents, (e.g. aspirin), and centrally acting muscle relaxants.

● Agents- Centrally Acting Muscle Relaxants

- Baclofen (Lioresal)
- Diazepam (Valium)
- Carisoprodol (Soma)
- Chlorphenesin (Maolate)
- Chlorzoxazone (Paraflex, Parafon Forte, Remular-S)
- Cyclobenzaprine (Flexeril)
- Medaxalone (Skelaxin)
- Methocarbamol (Robaxin)
- Orphenadrine (Norflex)
- Tizanidine (Zanaflex)

2. Mechanism of Action for Centrally Acting Muscle Relaxants

- Mechanism uncertain, but probably from sedative properties
- Has no direct effect on skeletal muscle
- Diazepam and tizanidine enhance presynaptic inhibition of motor neurons in CNS
- Enhancing effects of GABA (gamma-aminobutyric acid), an inhibitory neurotransmitter
- Baclofen suppresses hyperactive reflexes in spinal cord (possibly by mimicking the actions of GABA on spinal neurons)

3. Therapeutic Uses

- Treats localized spasm
- Decreases pain
- Increases ROM (Range of Motion)
- Reduces spasticity from multiple sclerosis, spinal cord injury, and cerebral palsy, but not stroke, Parkinson's disease, or Huntington's chorea

4. Adverse Effects

- CNS depression (drowsiness, dizziness, lightheadedness)

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- Potential liver damage
 - Physical dependence
 - Baclofen side effects: nausea, constipation, urinary retention
 - Cyclobenzaprine and orphenadrine- Atropine-like effects (dry mouth, blurred vision, photophobia, urinary retention, constipation)
 - Tizanidine- dry mouth, hypotension, hallucinations, and psychotic symptoms
 - Metocarbamol- urine discoloration (brown, black, or dark green)
 - Chlorzoxazone- causes hepatic necrosis and should not be used
 - Diazepam- potential for fetal harm during pregnancy, especially during the first trimester. Readily enters breastmilk, increasing to toxicity in infant
5. Patient Teaching Needed
- Avoid hazardous activities if significant CNS impairment occurs
 - Avoid alcohol or other CNS depressants (prevent intensified depressant effects)
 - Abrupt withdrawal can cause hallucinations, paranoid ideation, and seizures. When discontinued, withdraw gradually.
 - Warn women of childbearing years about potential for fetal harm if they become pregnant while taking diazepam (a benzodiazepine). If pregnancy occurs, drug should be withdrawn.
 - Discourage women from breastfeeding while on diazepam
6. Medication Administration
- Usually oral route
 - IV or IM route possible for methocarbamol or diazepam
 - Baclofen may be administered by intrathecal infusion using implantable pump, if needed
 - Diazepam may be given with food if gastric upset occurs. May be given rectally for treatment of seizures.
7. Agents- Direct Acting Muscle Relaxants
- Spasticity is movement disorder with heightened muscle tone, spasm, and loss of dexterity
 - Usually combined with physical therapy
 - Dantrolene (Dantrium)- promotes muscle relaxation by acting directly on skeletal muscle

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8. Mechanism of Action for Direct Acting Muscle Relaxants
 - Relieves spasm by suppressing release of calcium from the sarcoplasmic reticulum (SR) so skeletal muscles are less able to contract
 - Therapeutic doses have minimal effects on smooth muscle or cardiac muscle
9. Therapeutic Uses
 - Treats spasticity from multiple sclerosis, cerebral palsy, spinal cord injury, or stroke
 - Treats malignant hyperthermia, a rare, life-threatening syndrome from anesthesia or succinylcholine, a neuromuscular blocking agent
10. Adverse Effects
 - Decreases strength, and may reduce overall function
 - Liver damage- contraindicated with active hepatic disease (cirrhosis, hepatitis). Use lowest effective dosage for shortest time necessary
 - Muscle weakness, drowsiness, diarrhea, anorexia, nausea, vomiting, acne-like rash
11. Patient Teaching Needed
 - Signs of liver dysfunction (jaundice, abdominal pain, malaise)
 - Need liver function tests before initiating treatment and periodically
 - Monitor for reduction in muscle strength
 - Avoid hazardous activities if significant depressant effects occur
 - Avoid CNS depressants
12. Medication Administration
 - If no beneficial effects within 45 days, drug should be withdrawn
 - Usually oral dosing. May be given IV push when treating Malignant Hyperthermia crisis
 - For prevention of Malignant Hyperthermia prior to surgical anesthesia, give dantrolene 1-2 days prior to surgery
13. Therapeutic Goal
 - Relief of signs and symptoms of muscle spasm and spasticity

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