Amplified Musculoskeletal Pain Syndrome In Children
Barbra Murante, MS, RN, PNP
Golisano Children's Hospital

OBJECTIVES

• Review the physiologic changes in patients with amplified musculoskeletal pain syndrome (AMPS)
• Outline risk factors for developing AMPS
• Discuss how a patient with AMPS may present
• Review what is needed for successful treatment of AMPS

I have no financial conflicts to disclose
Sophia

- 14 year old female
- Completed first year of High School
- Is an “A” student
- Is on cross country and soccer team
- Plays saxophone in school band

Sophia, cont.

- In March, left lower leg was kicked while playing soccer
- Had a large bruise at site of injury, was painful for 3-4 days, but gradually improved, but was not gone. She stopped playing soccer for a week.
- About two weeks later, Sophia’s lower left leg pain worsened and was traveling to her foot.
- Her parents took her to PCP for evaluation; x-ray was normal.

What are your thoughts

- Give NSAIDS?
- Needs more time?
- Send for repeat imaging? MRI?
- Put in a boot or brace?
- Keep Sophia out of soccer?
Amplified Musculoskeletal Pain Syndrome

- Also known as:
  - RND - reflex neurovascular dystrophy
  - CRPS - complex regional pain syndrome
  - RSD - reflex sympathetic dystrophy
  - Pediatric fibromyalgia

Normal Pain Reflex

- Normally pain signals travel from the body through pain nerves, up the spinal cord, and to the brain, where the signal is recognized as pain.
- Once the initial pain source is no longer present, pain decreases.
Abnormal Pain Reflex

- With AMPS, pain signals travel through the spinal cord to the brain but also travel to the neurovascular nerves (autonomic nervous system / "fight or flight") that control blood flow
- The blood vessels constrict causing decreased oxygen delivery and blood flow to the muscles and increased lactic acid build up—causing additional pain
- Those additional pain signals also travel through this feedback loop—causing amplification of pain

Types of Amplified Pain

- Diffuse amplified pain
  - Total body pain
  - RSD
  - Pelvic fibromyalgia
- Intermittent amplified pain
- Localized amplified pain (CRPS) with autonomic changes
  - Color / temperature changes
  - Swelling
  - Sweating
  - Hair increase / decrease
- Localized amplified pain without autonomic changes
AMPS Causes

- Injury
  - Fracture
  - Sprain
  - Trauma
  - Concussion
- Illness (less Common)
  - Inflammatory process (myositis, arthritis)
  - Influenza, mononucleosis
- Psychological stress
  - Initial cause
  - Complicating factor with other cause

Other Contributing Factors

- Age (usually 12-18 years)
- Genetic Components
- Hormonal Components
- "Perfect Storm"

Common Co-Morbidities

- Hypermobility Syndrome
- Arthritis/arthritis
- GI complaints (IBD)
- Patellofemoral syndrome
- Anxiety
- Depression
- Functional neurologic disorder/Conversion Disorder
AMPS: Psychological Stress
- In at least 80% of children with AMPS, psychological factors seem to play a role
  - Changes
  - Fear/worry/shyness
  - Family stress
  - School stress

Patient/Family Characteristics
- Patient and family characteristics of Rochester patients
  - High Achieving/perfectionistic
  - Enmeshed with family member, usually mother
  - Active and driven (dancers, athletes, etc)
  - Conflict/distance with family member or past trauma
  (Salient & B esp. 10/16)

Back to Sophia
- Repeat Imaging was normal (including MRI)
- Started on Naproxen, twice daily without benefit
- Seen by local orthopedist who put her in a boot and took her out of soccer
Diagnosis of Exclusion

- Multiple medical appointments
- Many imaging exams and lab tests
- Families frustrated and want an answer
- Patient often feels like they will never get better

Effects on Sophia

- Condition worsened over three months
  - Non-ambulatory
  - Not in school
  - Not in sports

Sophia’s Physical Exam

- Demeanor is flat/tearful at times
- Presents in a wheelchair, left foot/lower leg bare
- Left lower leg/foot reddish/purple color, cold to touch
- Left lower leg/foot very sensitive to light touch (allodynia)
- Unable to bear weight
Golisano Children's Hospital Amplified Musculoskeletal Pain Program (GCHAMPP)

Current GCHAMPP Design

- Physician/NP evaluation in Peds Rheumatology with referral to:
  - Physical therapy
  - Occupational therapy
  - Individual and Family counseling/therapy
- Parent and Adolescent active dedication and involvement
- Collaboration with other systems: social work, school, PCP, outside care providers
Collaborative Team

- Shared goal and mission: to improve patient’s health and integrate families into treatment while supporting developmental transition to independence
- Clear roles and responsibilities
- Communication amongst team members

Frequency of Visits

- Initial medical evaluation with follow up after program completion (3 and 6 months)
- Weekly mental health counseling
- OT/PT 2-3 times a week for 6 weeks (more if needed). Home exercise program to be done all non-PT/OT days.

Individual & Family Therapy

- Key component in GCHAMPP
- Point out the mind body connection
- Validate pain: “we believe you are feeling pain, this is not all in your head”
Rationale for PT/OT

- Abnormal pain reflex can be disrupted by intense exercise and desensitization activities
- Children usually cannot perform exercises without encouragement: exercises are painful
- Focus on function: pain decreased only after function returns

PT/OT Evaluation and Treatment

- Initial PT and OT evaluations – parents can be present
- First treatment – 30 minutes each PT & OT
- Treatment time increases as patient progresses, up to 2-3 hours total
- Pain is not assessed or discussed during sessions
- Focus on function: higher levels of strength, endurance and function are expected each session

Occupational Therapy

- Desensitization approach of all 4 extremities and trunk (sensory bombardment)
  - Hot and cold activities
  - Scrubbing
  - Vibration
  - Deep pressure
- Focused upper extremity functional and therapeutic activities, and resistance exercises
Physical Therapy

- Gross motor training and body movement normalization
  - Stationary bike
  - Treadmill
- Address pre-existing orthopedic conditions
  - Patella-femoral pain
  - Lower back pain
  - Neck pain
- Strengthen core muscles

Sophia after completing GCHAMPP

- Fully participated in all aspects of the program (PT, OT, mental health and home exercise program)
- Able to attend school regularly
- Beginning to run again
- Planned to resume cross country racing in fall
- Learned valuable coping skills and relaxation techniques

Initial description of results

- 30 patients
- Intensive physical therapy with desensitization is a successful treatment
- More than half of patients completed program, with all having return to normal function and almost half having resolution of pain
Initial description of results

- More than two-thirds of patients who chose to withdraw from the program had not initiated psychotherapy
- Psychotherapy allows patients to complete the physical demands of the treatment
- Psychotherapy addresses the individual and family dynamics that are part of the process underlying the onset and perpetuation of symptoms

References

- Center for Amplified Musculoskeletal Pain, Children’s Hospital of Philadelphia
  - Web Address: http://www.chop.edu/services/therapeutics/hospital-treatment-program.aspx

Contact Information

Pediatric Rheumatology
Golisano Children’s Hospital
601 Elmwood Ave.
Rochester, NY 14642
(585) 275-4733
barbra_murante@urmc.rochester.edu