Post Viral Rhabdomyolysis
Literature Review and Stance Control Case Study

Gary G. Bedard, CO, FAAOP[1], Bryan Malas, MHPE, CO, LO[2]

Becker Orthopedic[1], Ann and Robert H. Lurie Children's Hospital[2]

Introduction

Rhabdomyolysis is frank dissolution of skeletal muscle. The striated cell necrosis leads to leakage of muscle constituents into the circulation. Myoglobin is the primary oxygen constituent carrying pigment of muscle tissues. The released myoglobin is filtered by the kidneys and can block tubules leading to acute renal failure. Renal failure occurs in a reported 10 – 50% of rhabdomyolysis cases. Presenting symptoms in viral cases include myalgias, weakness, muscle tenderness, and brown urine.

Influenza is the predominant reported viral infection. The exact pathophysiology of the virus induced myoglobinuria is unknown; two mechanisms have been offered, direct viral invasion and toxin generation. Other avenues to rhabdomyolysis include traumatic crush injuries, the use of limb restraints, strenuous exertional activities (e.g. marathon) and intoxicated individuals subjected to prolonged muscle compression from being motionless. Treatment is rapid hydration with up to ten liters a day of IV fluid. Overall prognosis if renal failure is prevented is good.

Case Description

A 15 year-old female with a diagnosis of Post Viral Rhabdomyolysis was seen at two institutions with an unknown etiology. Due to presenting symptoms the original diagnosis was thought to be Guillain-Barre' but was ruled out as the presenting symptoms are similar. Two weeks of inpatient care were followed by 3 months of outpatient physical therapy before being followed at Lurie Children's Hospital. PLS ankle foot orthoses were initially used for ambulation with "knee cages" without success. Patient c/o muscle pain in lower back and thighs at the level that sleep was impacted. Patient demonstrated exercise intolerance, and unsteady abnormal gait. An early positive fall history was provided during her history.

Physical Rehab

Observational gait revealed a high degree of stance phase anterior/posterior knee hysteresis; "wobbly knees" when walking with a wheeled walker. Additionally there was a noticeable decrease in step length and velocity.

Immediate fit stance control orthoses (IFSCO) were utilized to assess and stabilize the patient's gait pattern. Swing and stance phase gait training techniques were utilized to appropriately activate the IFSCO. These techniques helped the patient to recognize the step length release of the mechanical stance control orthotic knee joints along with swing phase technique to register appropriate hip flexion velocity for engagement of the knee locks at terminal swing.

MUSCLE STRENGTH

	Left	Right
Iliopsoas	2+	2+
Gluteus Max	2+	2+
Gluteus Med	2+ with TFL	2+ with TFL
Adductors	2	2+
Quadriceps	3+	3+
Hamstrings	X *painful	X *painful
Ant Tibialis	4-	4-
Post Tibialis	4-	4-
Peroneals	4-	4-
Gastroc	4- hand test	4- hand test

Improvements in gait stability were achieved and custom stance control orthoses were provided. Gait training continued in the custom devices with a marked reduction in knee hysteresis and corresponding increase in gait velocity. Subjective feedback from the patient included improves stability during standing and ambulation and improved endurance.

Conclusion

Massive necrosis of stiated muscle cell with the leakage of cell constituents into the blood stream is characterized by muscle weakness and gross pigmenturia for both traumatic and nontraumatic Rhabdomyolysis. Nontraumatic toxic elements to muscles include alcohol, illicit drugs, viral infections and strenuous exercise. In this particular case, renal failure was not evident, but the muscle necrosis was present along with associated pain.

The physical rehab utilization of the IFSCO demonstrated an immediate improvement in gait stability while the provision of custom SCO offered a public means for the patient to acquire a stable gait for locomotion.

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