VANDERBILT UNIVERSITY MEDICAL CENTER

Protocol: Pediatric Burn Hypermetabolic Response	Category	Clinical Practice
	Protocol Number	BC-P-03
	Approval Date	November 1, 2016
	Due for review	November 1, 2018

Applicable to
☐ VUH ☒ Children's ☐ DOT ☐ VMG Off-site locations ☐ VMG ☐ VPH ☐ Other
Team Members Performing
☐ All faculty & staff ☒ Faculty & staff providing direct patient care or contact ☒ MD ☒ House Staff ☒ APRN/PA ☒ RN ☐ LPN ☐ Other:
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I. Population:

The hypermetabolic response in burn patients is characterized by hyperdynamic circulatory, physiologic, catabolic, and immune system responses.

The administration of agents that reduce the hypermetabolic response is an essential component of the management of pediatric burns.

II. Assessment:

Hypermetabolic management should be considered if a patient meets the following criteria:

1. TBSA greater than 20% [1]
2. Will require at least one operation
3. >72 hour after admission
4. Hemodynamically stable (not on pressers or requiring fluid boluses)

III. Intervention/Treatment:

Propranolol

1. Mechanism- Propranolol attenuates the hypermetabolism and reverses muscle-protein catabolism. [2]
2. Benefits- reductions in heart rate, cardiac work, lipolysis, hepatic steatosis, and skeletal muscle breakdown, and increased creation of skeletal muscle.

Propranolol	
Goal	Titrated to decrease heart rate by 15-20% [3] Target HR: Mean HR*-15-20% ** average resting HR during previous 24 hours*
Dose	Initiate at 1mg/kg/day divided into 4 doses Reassess daily until target HR achieved. May increase to max of 4mg/kg/day divided into 4 doses

Oxandrolone:

1. Mechanism- The use of oxandrolone, an analog of testosterone possessing only 5% of its virilizing androgenic effects, enhances anabolism of muscle protein by improving the efficiency of protein synthesis.[4]
2. Benefits- Oxandrolone decreases loss of body weight and improves healing of the donor site wound.[5]

Oxandrolone	
Dose	0.1 mg/kg BID

IV. Other Considerations:

Nutrition

Adequate nutrition is imperative for the treatment of severely burned and critically ill patients to reduce the catabolic effects of burn injury. The Burn Nutrition Protocol should be followed.

Pain Management

Pain management is important to decrease the hypermetabolic response. See the Pediatric Burn Protocol for recommendations.

Glycemic Control

Glycemic control in critically ill patients leads to lower incidences of sepsis and mortality compared with patients who had poor glucose control. Monitor blood glucose levels and consider insulin for ICU level burn patients.

DURATION OF ADMINISTRATION

Burn-induced hypermetabolic response lasts for at least 1 to 2 years after the injury.[5, 6, 7] Continuation of propranolol and oxandrolone after discharge should be considered when primary care is established.

V. References:

1. Deitch EA. Nutritional support of the burn patient. Crit Care Clin 1995; 11:735.

2. Finnerty, C. C., & Herndon, D. N. (2013). Is propranolol of benefit in pediatric burn patients?. Advances In Surgery, 47177-197.

3. Baron PW, Barrow RE, Pierre EJ, et al. Prolonged use of propranolol safely decreases cardiac work in burned children. J Burn Care Rehabil. 1997;18:223-227.

4. Hart DW, Wolf SE, Ramzy PI, et al. Anabolic effects of oxandrolone after severe burn. Ann Surg. 2001;233:556-564.

5. Demling RH, Orgill DP. The anticatabolic and wound healing effects of the testosterone analog oxandrolone after severe burn injury. J Crit Care. 2000;15:12-17.

6.. Jeschke MG, Gauglitz GG, Kulp GA, et al. Long-term persistance of the pathophysiologic response to severe burn injury. PLoS One. 2011; 6:e21245. [PubMed: 21789167]

7. Herndon DN, Tompkins RG. Support of the metabolic response to burn injury. Lancet. 2004; 363:1895–902. [PubMed: 15183630]