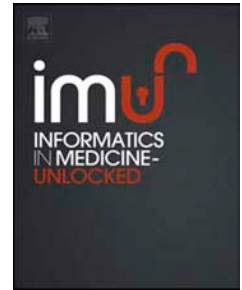


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# A Qualitative Numerical Study of Glucose Dynamics in Patients with Stress Hyperglycemia and Diabetes Receiving Intermittent and Continuous Enteral Feeds

Richard J. Strilka<sup>a,\*</sup>, Scott T. Trexler<sup>b</sup>, Tyson J. Sjulinc, Scott B. Armen<sup>d</sup>

<sup>a</sup>*Division of Trauma, Critical Care, and Acute Care Surgery, University of Cincinnati Medical Center, 231 Albert Sabin Way (ML 0558), Cincinnati, OH, 45267*

<sup>b</sup>*Department of Trauma and Critical Care Surgery, San Antonio Military Medical Center, 3551 Roger Brooke Drive, Fort Sam Houston, San Antonio, TX, 78219*

<sup>c</sup>*Department of Pulmonary Medicine, San Antonio Military Medical Center, 3551 Roger Brooke Drive, Fort Sam Houston, San Antonio, TX, 78219*

<sup>d</sup>*Division of Trauma, Acute Care and Critical Care Surgery, Pennsylvania State College of Medicine, 500 University Drive, Hershey, PA 17033*

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## Abstract

**Background:** Using 12 healthy adults, it was shown that a reduction in mean glucose concentration follows intermittent gastric feeds, not continuous: a desirable result for hospitalized patients. A numerical study comparing glucose dynamics after intermittent gastric and continuous post-pyloric feeds may inform the design of a similar clinical study in the critical care setting.

**Methods:** A mathematical model was used to construct a small virtual crossover study comparing intermittent gastric feeds and continuous post-pyloric feeds. The model, validated for eight diabetic patients, produced maximum glucose concentration, mean glucose concentration and glucose concentration standard deviation data. Simulations were repeated after renal insulin clearance was increased by 50%, a common physiologic alteration in critical illness. Five hypothetical patients with stress hyperglycemia also underwent simulation.

**Results:** Mean glucose concentration was significantly lower after intermittent gastric feeds in type 1 diabetics and in the stress hyperglycemia patients. Without insulin therapy, intermittent gastric feeds increased maximum glucose concentration more than continuous post-pyloric feeds, and glucose concentration standard deviation was largest after intermittent gastric feeds in all patients. Also, the continuous glucose concentration data suggests that the total amount of insulin required to treat patients with stress hyperglycemia would be least in the intermittent feed arm.

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\*Corresponding author

Email address: [af.doc.mil@gmail.com](mailto:af.doc.mil@gmail.com) (Richard J. Strilka)

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