



The Medical **Bulletin**

In Critical Care

1. Aerobic exercise lowers BG levels during and after exercise in most people with diabetes. Resistance exercise causes less initial BG decline but smoother and more prolonged reductions of post-exercise BG. Intermittent high-intensity exercise reduces BG less than moderate, consistent exercise. BG levels increase with resistance and high-intensity exercise in some people and often rise significantly during competition.
2. The primary drivers of hypoglycemia during exercise are non-insulin-mediated glucose uptake by muscle, inability to lower circulating insulin levels during exercise, more rapid insulin absorption from SQ sites, inadequate carbohydrate intake during exercise, and variable insulin sensitivity during and after exercise.
3. The key elements of diabetes management during exercise are frequent BG testing, adequate nutritional intake, appropriate insulin adjustments, anticipation of exercise effects, and adequate hydration.
4. Use of a continuous glucose monitor (CGM) plus an algorithm that makes carbohydrate intake recommendations based on current glucose levels and trend arrows has been reported to significantly improve exercise glucose control in adolescents with T1D.
5. Insulin pump therapy limits post-exercise hyperglycemia without increasing the risk for hypoglycemia compared with multiple daily insulin injections. Basal rate reductions starting 60 to 90 minutes before exercise and continuing for 60 to 90 minutes after exercise usually work well for moderate exercise of ≥ 60 minutes or strenuous exercise of ≥ 30 minutes.
6. Target BG levels during hospitalization are 140 to 180 mg/dL for critically ill and non-critically ill patients; the goals can be lowered to 110 to 140 mg/dL in select individuals as long as hypoglycemia is carefully avoided. Glycemic goals in pregnant women are lower: fasting < 95 mg/dL, 1 hour post-meal < 140 mg/dL, 2 hours post-meal < 120 mg/dL.
7. Several important principles of hyperglycemia management in hospitalized patients should be followed. Insulin is the most appropriate agent for treating hyperglycemia in the hospital. IV insulin infusions are best for critically ill patients. Basal/bolus (prandial and correction) insulin regimens are best for non-critically ill patients. BG patterns should be evaluated daily and insulin adjusted as needed.
8. Elements that should be part of all inpatient insulin infusion protocols include setting appropriate glucose targets; nurse-driven, easy-to-use insulin titration protocols; frequent point-of-care glucose measurements; insulin titration based on current glucose levels and the direction and velocity of glucose changes; and acute hypoglycemia management guidelines that include insulin dosing adjustments to prevent further hypoglycemia.



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9. A CGM has three components: (1) a sensor that is inserted under the skin and measures interstitial glucose levels almost continuously (every 1–5 minutes), (2) a transmitter that wirelessly transmits glucose values to a receiver, and (3) a receiver that displays glucose values in real time or intermittently and shows trend arrows to inform the user about the direction and magnitude of glucose changes.
10. Professional CGM devices are owned by providers and loaned to users for 1 to 2 weeks at a time, either recording blinded glucose patterns or displaying real-time glucose values that can be downloaded for analysis by providers and/or certified diabetes education specialists.

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