Performance of a Non-ICU Insulin Infusion Protocol in Hyperglycemic Inpatients

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**Background:** Intravenous insulin infusions are standard practice in most ICUs, with many published protocols validated as safe and effective in this setting. They are not typically used, however, on general medical-surgical wards, because of safety concerns and less nursing supervision. Moreover, there are few published insulin infusion protocols (IIPs) for non-critically ill patients, despite the fact that severe hyperglycemia requiring aggressive treatment occurs frequently outside the ICU.

**Specific Aims/Hypothesis:** We aimed to assess the efficacy and safety of an insulin infusion protocol specifically designed for the general wards for treatment of severe hyperglycemia. We proposed that using such a protocol, severe hyperglycemia on the general inpatient wards can be safely treated.

**Methods:** We developed an IIP specifically for non-critically ill patients on general wards, targeting a blood glucose (BG) of 100-150 mg/dl. In a retrospective analysis of the first 50 infusions, we focused on those 34 which were initiated for the recommended hyperglycemic threshold of ≥300 mg/dl.

**Results:** The mean baseline BG was 406±69mg/dl, duration of infusion 18.3±18.4 hours, and time to target BG 10.9±7.1 hours. The mean BG during the entire infusion was 257±69 mg/dl, but, once the target was achieved, the subsequent mean BG was 153±39 mg/dl. There was only 1 hypoglycemic value (<70mg/dl) recorded, accounting for 0.2% of all infusion-hours. Median adherence to the protocol's hourly instructions in all patients was 64%.

**Conclusions:** This IIP appears to adequately lower elevated BGs without significant hypoglycemia in the non-ICU setting. However, adherence to its instructions, which include hourly BG monitoring, was lower than expected and presents a quality improvement opportunity. The barriers to better adherence have not yet been ascertained but are worthy of further study. These may include the protocol itself, the adequacy of staff in-servicing, or the challenges of competing priorities for nurses on busy hospital wards. The latter would appear to be most likely, since the protocol is directly adapted from our highly successful ICU IIP, with a near identical sequence of instructions and similar pre-implementation training.