INSULIN INFUSION – ADULT ACUTE CARE UNIT

Discontinue all previous orders for insulin and oral hypoglycemic agents.

Nursing
- CBG (POC) Routine, SEE COMMENTS: Per ordered Insulin Infusion Protocol

IV Fluids  Typically choose either D5/NS or D5/0.45NS with or without additional KCl
- IV fluids continuous infusions _________________ at ______ mL/hr Intravenous, CONTINUOUS

MEDICATIONS  See attached Adult Acute Care Unit Insulin Protocol

Insulin Infusion
- Prescribe 1 unit/hr dosing for patients with type 2 diabetes or type 1 diabetes whose weight is greater than 70 kg or require more than 30 units of insulin per day prior to admission.
- Prescribe 0.5 unit/hr dosing for patients with type 1 diabetes whose weight is less than 70 kg or require less than 30 units of insulin per day outpatient.
- insulin IV infusion (NON-PYXIS) 0.25-40 Units/hr, Intravenous, CONTINUOUS

Protocol: Intensive Care Unit while in ICU; Adult Acute Care Unit while in Acute Care

Starting rate:
- 0.5 unit/hr
- 1 unit/hr
- ________ unit/hr

Mealtime Insulin  No mealtime insulin if patient is NPO
- insulin lispro (aka HUMALOG) subcutaneous _______ Units, Subcutaneous, THREE TIMES DAILY WITH MEALS.

Administer immediately before meal if eating is predictable or immediately after meal if eating is unpredictable:
- Full meal (75-100%) = _______ units (20% of basal calculation)
- 2/3 Meal (41-75%) = _______ units (14% of basal calculation)
- 1/3 Meal (26-40%) = _______ units ( 8% of basal calculation)
- <1/4 or NPO (0-25%) = Hold Lispro
Hypoglycemia


☑ Hypoglycemia Protocol – Adult Routine, CONTINUOUS
  Institute for CBG < 70 mg/dL.

☑ dextrose 50% (aka D50W) IV 25 mL, Intravenous, AS NEEDED for hypoglycemia, CBG < 70 mg/dL.
  -If patient unable to take PO, administer by slow IV push, followed by a flush with 5 mL of normal saline
    (hypertonic solution that can cause sclerosis of the vein if not flushed).
  -Please refer to Adult Hypoglycemia Protocol.

☑ glucagon (aka GLUCAGEN) IM injection 1 mg, Intramuscular, AS NEEDED for hypoglycemia,
  CBG < 70 mg/dL. Please refer to Adult Hypoglycemia Protocol.

☑ glucose chewable tablets 16 g, Oral, EVERY 15 MINUTES AS NEEDED for hypoglycemia,
  CBG < 70 mg/dL. Administer for CBG ≤ 70 mg/dL. Please follow Adult Hypoglycemia Protocol.
# Adult IV Insulin Infusion Table

**To Initiate Protocol, Refer to**

“Insulin Infusion Orders for Non-ICU Adults with Diabetes Mellitus”

<table>
<thead>
<tr>
<th>If Current CBG is below 70</th>
<th>Change in Insulin Rate</th>
<th>Check CBG in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treat hypoglycemia per protocol (Standard of Nursing Care: Adult Inpatients, Diabetes Care)</td>
<td>Reduce insulin drip to 0.1 unit/hr and continue maintenance infusion.</td>
<td>Q 15 min. until above 120</td>
</tr>
<tr>
<td>If 2 episodes of CBG below 100 in 6 hour period, call HO to reevaluate need for continued insulin infusion.</td>
<td>When CBG above 120, resume insulin drip at 50% of previous rate.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>If Current CBG is between 71-99</th>
<th>Change in Insulin Rate</th>
<th>Check CBG in</th>
</tr>
</thead>
<tbody>
<tr>
<td>If 2 episodes of CBG below 100 in 6 hour period, call HO to reevaluate need for continued insulin infusion.</td>
<td>Reduce insulin drip to 0.1 unit/hr and continue maintenance infusion.</td>
<td>Q 30 min. until above 120</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>If Current CBG is between 100-120</th>
<th>Change in Insulin Rate</th>
<th>Check CBG in</th>
</tr>
</thead>
<tbody>
<tr>
<td>and if previous CBG was below 191</td>
<td>↓ Decrease rate by 0.5 units/hr</td>
<td>1 hour</td>
</tr>
<tr>
<td>and if previous CBG was 191-250</td>
<td>↓ Decrease rate by 1 unit/hr</td>
<td>1 hour</td>
</tr>
<tr>
<td>and if previous CBG was 251-400</td>
<td>↓ Decrease rate by 2 units/hr</td>
<td>1 hour</td>
</tr>
<tr>
<td>and if previous CBG was above 400</td>
<td>↓ Decrease rate by 3 units/hr</td>
<td>1 hour</td>
</tr>
</tbody>
</table>

*Note: When converting to SQ insulin: change at meal time and D/C IV insulin infusion 1 hour after regular insulin SQ or 30 minutes after NovoLog SQ.*

<table>
<thead>
<tr>
<th>If Current CBG is between 121-180</th>
<th>Change in Insulin Rate</th>
<th>Check CBG in</th>
</tr>
</thead>
<tbody>
<tr>
<td>and if previous CBG was below 191</td>
<td>No Change</td>
<td>2 hours</td>
</tr>
<tr>
<td>and if previous CBG was 191-250</td>
<td>↓ Decrease rate by 1 unit/hr</td>
<td>1 hour</td>
</tr>
<tr>
<td>and if previous CBG was 251-400</td>
<td>↓ Decrease rate by 2 units/hr</td>
<td>1 hour</td>
</tr>
<tr>
<td>and if previous CBG was above 400</td>
<td>↓ Decrease rate by 3 units/hr</td>
<td>1 hour</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>If Current CBG is between 181-250</th>
<th>Change in Insulin Rate</th>
<th>Check CBG in</th>
</tr>
</thead>
<tbody>
<tr>
<td>and if current CBG has decreased by more than 10 mg/dL compared to previous CBG.</td>
<td>No Change</td>
<td>1 hour</td>
</tr>
<tr>
<td>and if current CBG has NOT decreased by more than 10 mg/dL compared to previous CBG or has increased</td>
<td>↑ Increase rate by 0.5 units/hr</td>
<td>1 hour</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>If Current CBG is above 250</th>
<th>Change in Insulin Rate</th>
<th>Check CBG in</th>
</tr>
</thead>
<tbody>
<tr>
<td>and if current CBG has decreased by more than 100 mg/dL compared to previous CBG</td>
<td>↓ Decrease rate by 1 unit/hr</td>
<td>1 hour</td>
</tr>
<tr>
<td>and if current CBG has decreased by 30-100 compared to previous CBG</td>
<td>No change</td>
<td>1 hour</td>
</tr>
<tr>
<td>and if current CBG has not decreased by more than 30 mg/dL compared to previous CBG or has increased</td>
<td>↑ Increase rate by 1 unit/hr</td>
<td>1 hour</td>
</tr>
<tr>
<td>AND if CBG has not decreased below 250 after 3 adjustments in the infusion rate</td>
<td>Call HO</td>
<td>1 hour</td>
</tr>
</tbody>
</table>
Insulin Infusion Protocol
for Non-ICU Adults with Diabetes Mellitus

This is a guideline only and should not be substituted for individual clinical judgment.

General Statement:
Insulin infusions are a safe and effective way to obtain good glycemic control in the hospitalized patient. IV insulin acts rapidly and can be easily titrated up or down based on patient circumstances and blood sugar levels. This process is most effective in those patients receiving constant caloric intake (D5, TPN, continuous tube feeds, etc.) Patients with Type 1 diabetes produce little or no insulin, are generally thin, and are very insulin sensitive (will likely require lower rates of insulin infusion.) Patients with Type 2 diabetes do not produce an adequate amount of insulin and are generally insulin resistant (will likely require higher rates of insulin infusion). It is important to not only know what a patient’s current CBG is, but also know how it is changing (i.e. compare it to previous CBG).

Treatment Goals:
1. Maintain CBGs between 120–180 mg/dl. Higher glucose targets may be indicated in the elderly or in those with ischemic heart disease. lower glucose targets may be required for special circumstances such as in pregnancy or in patients with a history of pancreas transplantation.
2. Prevent Hypoglycemia. As with any form of insulin use, untreated hypoglycemia can increase risk of MI, CVA, seizures, brain injury, coma, and death.
3. Prevent Hyperglycemia. Untreated hyperglycemia can lead to excess catabolism, dehydration, potential DKA, and hyperosmolarity.
4. Promote Recovery. Leukocyte function, wound healing, and fluid and electrolyte balance are positively affected in patients with CBG < 180.

Indications for Use of Insulin Protocol:
1. Poor glycemic control (i.e. CBG > 300 despite efforts to reduce with subcutaneous insulin).
2. NPO > 24 hours, or who have poor or erratic PO intake.
3. Stress during hospitalization (e.g. ischemia/MI, surgery, infection, stressful procedure, etc.)
4. Peri-operative (NPO or erratic feedings, stress, infection, etc.)

Implementation of Insulin Protocol:
1. Orders to be initiated by signature of physician.
2. One hour after initiating the IV insulin infusion, take CBG. On infusion table, locate the range in which the current CBG falls. Under current CBG, locate previous CBG. Adjust insulin rate according to directions for that current and previous CBG.
3. Continue checking CBGs and adjusting the drip rates at the time intervals indicated on the table.
4. If current CBG is below 70, treat hypoglycemia per protocol (Standard of Nursing Care: Adult Inpatients, Diabetes Care).
5. Document current CBG and drip rate on the Diabetes Record.
6. When discontinuing the drip, convert to SQ insulin at mealtimes. D/C IV insulin infusion one hour after regular insulin SQ, or 30 minutes after insulin aspart (NovoLog) SQ.

Special Considerations:
1. When patients remain on an insulin infusion as they are eating, pre-meal SQ insulin is required. Meal doses can be approximated as 25-30% of the 24 hours fasting IV insulin requirement per meal, given as Regular insulin 30 minutes ac or insulin aspart (NovoLog) < 10 minutes ac (or occasionally after meals if intake is uncertain.
2. This protocol is not designed for ICU patients or patients in DKA/HHS.

References:

Produced by the Diabetes Center and the Inpatient Diabetes Task Force