GUAM MEMORIAL HOSPITAL AUTHORITY
DIABETIC KETOACIDOSIS PROTOCOL

DATE: ___________________

ADMITTING PHYSICIAN

TIME: ___________________

ADMITTING DIAGNOSIS

Admit Patient to Inpatient Status: □ ICU □ Telemetry

<table>
<thead>
<tr>
<th></th>
<th>□ DKA</th>
<th>□ HHS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Glucose (mg/dL)</td>
<td>&gt; 250</td>
<td>&gt; 600</td>
</tr>
<tr>
<td>Serum bicarbonate (mEq/L)</td>
<td>≤ 18</td>
<td>&gt; 18</td>
</tr>
<tr>
<td>Serum pH</td>
<td>≤ 7.3</td>
<td>&gt; 7.3</td>
</tr>
<tr>
<td>Anion Gap</td>
<td>&gt;10</td>
<td>variable</td>
</tr>
<tr>
<td>Serum Osmolality (mOsm/kg)</td>
<td>variable</td>
<td>&gt; 320</td>
</tr>
</tbody>
</table>

OTHER COMORBID DISEASES:
□ MRSA □ Pneumonia □ Urinary Tract Infection
□ Pregnant □ Other: ___________________ □ Pressure Ulcer: ___________________ (location)

ALLERGIES: □ NKDA □ YES __________ Specify reaction: ___________________

HEIGHT: _____ft _____in WEIGHT: _______________ kg

CONDITION □ Fair □ Serious □ Critical

ACTIVITY □ Bed Rest DIET □ NPO

RESPIRATORY □ ______ L/min NC □ Titrate to keep O2 sat>94% □ VentiMask _____% □ NRB □ BiPaP __________

NURSING □ Strict I/O □ Vital signs per protocol
□ Foley Catheter □ Q1 hour neurochecks while on insulin infusion

NOTIFY PHYSICIAN (any of the following)
• HR<50 or HR>120
• RR<12 or RR>32
• UOP<0.5ml/kg/hr
• SBP<90 or SBP>160
• Temp>100.3F (new onset)
• Change in mental status
• DBP>110
• O2 sat<90%
• Resolution of DKA/HHS

LABS □ Basic Metabolic Panel (Chem7) □ Complete Metabolic Panel (Chem20)
□ CBC with auto differential □ ABG every 2 hours until serum pH>7
□ Urinalysis □ Acetone, serum
□ Renal Panel (BUN, SCr) □ Magnesium
□ Repeat Chem7 every _____ hours □ Serum osmolality every 4 hours until serum osmol ≤ 320mOsm/kg

Physician initial: ____________
IV FLUIDS

A. BOLUS
   □ 0.9% NaCl 1000mL over 1 hour x _____ liters
   □ Other ___________ at ______ ml/hr x _____ liters

B. MAINTENANCE (Corrected Na = serum Na + [0.016 x (serum glucose mg/dL -100)]
   □ 0.9% NaCl at _____ ml/hr (recommended for corrected Na<136mmol/L)
   □ 0.45% NaCl at _____ ml/hr (recommended for corrected Na≥136mmol/L)
   □ Other ___________ at _____ ml/hr

** Change to dextrose containing IVF once BG<250 for DKA and BG<300 for HHS **
   □ D5-1/2NS at ______ ml/hr
   □ Other ___________ at ______ ml/hr
   □ Add _____ mEq KCl to MIVF when K ≤ 5.2mmol/L
   □ Discontinue KCl from MIVF if K ≥ 5.2mmol/L

INSULIN INFUSION

• TARGET BLOOD GLUCOSE 140-180mg/dL (ICU) preprandial <140 (non-ICU)
• Do not initiate insulin if K ≤ 3.3mmol/L
• Accuchecks every hour while on insulin infusion.
• Start insulin infusion of Regular insulin 100units/NS 100mL (1unit/mL)
  □ Bolus=0.1unit/kg IV x _______ kg = __________ units (PHYSICIAN MUST COMPLETE)
  □ Infusion=0.1unit/kg/hr IV x _______ kg = _________ units/hr (PHYSICIAN MUST COMPLETE)
  □ Hold insulin if K ≤ 3.3mmol/L

INSULIN DRIP RATE ADJUSTMENT PROTOCOL

<table>
<thead>
<tr>
<th>BLOOD GLUCOSE RANGE</th>
<th>INSULIN DRIP RATE ADJUSTMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>BG &lt; 70mg/dL</td>
<td>Hold Insulin Drip</td>
</tr>
<tr>
<td>BG 70-100mg/dL</td>
<td>Implement GMH Hypoglycemia protocol</td>
</tr>
<tr>
<td>BG 100-140mg/dL</td>
<td>Hold insulin drip and repeat BG level every 30min until BG&gt;180mg/dL and then restart drip at 50% of the previous rate</td>
</tr>
<tr>
<td>BG 140-180mg/dL (TARGET RANGE)</td>
<td>decrease drip rate by 25%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IF BG&gt;180mg/dL</th>
<th>Insulin Drip Rate Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Δ BG &lt; 25mg/dL</td>
<td>increase drip rate by 50%</td>
</tr>
<tr>
<td>Δ BG 25-50mg/dL</td>
<td>increase drip rate by 25%</td>
</tr>
<tr>
<td>Δ BG 50-75mg/dL</td>
<td>KEEP CURRENT RATE</td>
</tr>
<tr>
<td>Δ BG 75-100mg/dL</td>
<td>decrease drip rate by 25%</td>
</tr>
<tr>
<td>Δ BG &gt; 100mg/dL</td>
<td>decrease drip rate by 50%</td>
</tr>
</tbody>
</table>

Physician initial: ____________
ADJUSTING THE INFUSION
• If patient remains in goal range, do not adjust the rate until the BG falls out of goal range.
• If BG remains >180mg/dL and is elevated from previous accucheck, increase insulin drip rate by 50% and recheck in one hour per protocol.
• If nutritional therapy (e.g., TPN or tube feeds) is discontinued or slightly reduced, decrease insulin infusion rate by 50% and reinstate hourly blood glucose checks.

Hypoglycemia (capillary BG < 70mg/dL) – HOLD INSULIN DRIP.
• Implement GMHA hypoglycemia protocol.
• Once BG > 200mg/dL, resume infusion at 50% of previous infusion rate.

Notify the physician
• BG remains over 350mg/dL.
• Hypoglycemia (BG < 70mg/dL)
• DKA resolved (stop insulin drip)

DKA Resolution
• BG < 200mg/dL
• Serum bicarb ≥ 15mmol/L
• Anion gap ≤ 12

HHS Resolution
• Serum osmol<320mOsm/kg
• Normal mental status

IV to SQ INSULIN TRANSITION
• Evaluate patient’s nutritional intake to calculate the Total Daily Dose (TDD) of insulin.
• Step 1: Average the rate of insulin infusion when BG has stabilized.
• Step 2: Multiply by 24 hours. Multiply the 24 hour insulin requirement by 75% = TDD.
• Step 3: Divide the TDD into the appropriate insulin regimen.

(See sample calculations below)
  o 50% basal insulin + 50% prandial insulin
  o Prandial insulin dose divided TID if tolerating meals or Q6H if on continuous tube feeds.

Example: Average rate of insulin infusion is 2units/hr.
          TDD = 2units/hr x 24hrs = 48units x 75% = 36units TDD
          50% TDD = 18units given as basal insulin (NPH, Lantus, Levemir, Tujeo)
          50% TDD = 18units divided TID as prandial insulin = 6units TID
          *If on tube feeds = 18 units divided Q6H as prandial insulin = 5units Q6H

Physician: ____________________________________________

Date: ________________ Time: ___________________________