Ketogenic Diet ("classic" and "modified") Guidelines Quick Reference

Blood Sugars

- **New start during diet initiation,** monitor every 4-6 hours until on goal plan and glucose is stable. For new initiations, blood sugars should not be checked prior to a meal/formula. The child should be fed first and then the blood sugar should be checked.
- If **not a new initiation**, patient is stable and there are no concerns for hypoglycemia, for example **patient is not on NPO**, then it's **not necessary to monitor** glucose while admitted.
- A low blood sugar for a ketogenic patient is < 40mg/dl. **Do not treat unless their blood sugar is < 40 mg/dl** OR showing signs of hypoglycemia
- Ketogenic patients with a blood sugar < 40 mg/dl should receive **30-60 mL of 100% juice** (any kind), or 30 mL term formula/HM (<6 months) or if NPO, can use D10W over 30 minutes. After treatment blood sugars should be re-checked in 15 minutes to make sure the blood sugar has rebounded >50mg/dl.
    - **Juice/Formula**
        - < 1 year old → 30 mL HM or term formula (~2 grams carbohydrates)
        - > 1 year old → 30-60 mL juice (3-6 grams carbohydrates)

    - **If NPO**
        - 1 month - 1 year → 2.5 mL/kg D10W over 30 minutes, maximum 250 mL
        - 1 - 2-years old → 10 mL/kg D10W over 30 minutes, maximum 250 mL
        - 2 years - 12 years old → 60 mL D10W over 30 minutes
        - > 12 years old → 80 mL D10W over 30 minutes

Ketones

- Urine ketones (goal moderate to large)
    - New start – q every void
    - Stable – daily to weekly
- Serum beta-hydroxybutyrate (ketones) (goal 3-7 mmol/L)
    - For new starts -- day 3 or 4 after the initiation
    - If stable – upon admission or weekly for prolonged admissions

If excessive ketosis is suspected including large urine ketones or BHB >7 mmol/L **WITH** nausea, vomiting, rapid or shallow breathing, extreme sleepiness, facial flushing → give 30 mL juice (any kind). If the symptoms persist after 20 minutes, give another 30 mL of juice. An IV drip may be needed to correct excessive ketosis. Physicians may also use bicarb supplementation if necessary.

Note: If patient is **not symptomatic** and BHB >7 mmol/L, do not make any changes. If patient has good seizure control and ketosis is low (i.e. small urine levels or BHB <3 mmol/L), do not make any changes.

Please notify the Ketogenic Diet team when able, if needed. We treat symptoms and seizures; not urine/blood levels.

Liquid Medications/Supplements

- If a liquid, suspension, chewable medication or supplement is being prescribed, please double check that this is the lowest carbohydrate form with the pharmacy. Most liquid and chewable medications contain too many carbohydrates for these patients. We aim to keep carbohydrates from medications/supplements to <1000 mg/day.
- Some liquid medications are acceptable so please check the last ketogenic RD note to determine if a liquid medication has been factored into their plan and has been approved it for use.
- Resource: In Lexicomp, search "carbohydrate" and you will find a detailed list of carbohydrate contents of frequently used medications.
- It is okay to use home supply of any supplements. If the family did not bring the home supply then you can use an alternative if it is a capsule or tablet (no liquids or chewables). If family did not bring home supply and we do not have an appropriate alternative, then do not give the supplement (this is acceptable short term).

IV Fluids

- Double check IV fluids, ensure it does not contain dextrose.
- If IV fluids are necessary and patient is tolerating feedings (Pedialyte/half strength OR full strength), give non-dextrose containing IVF.
- If they are not tolerating feedings and:
    - NPO will be suspected <12 hours, give non-dextrose containing IVF
    - NPO will be 12-24 hours, give non-dextrose containing IVF but check dexi q 4-8 hours
- Make sure IV medications do not contain dextrose

Clear Liquids

- If a patient is not tolerating feeds but able to have clear liquids and:
    - NPO > 12 hours, half strength Pedialyte is appropriate
    - NPO will be suspected <12 hours, give non sugar containing fluids only (no Pedialyte).
- A patient should not receive both Pedialyte and dextrose containing IVF at the same time.
- For "modified" patients, they can have up to 1 liter of Pedialyte in a 24-hour time frame.
    - This should be spread throughout the day in 6 oz increments (half strength) every 3-4 hours. They should not be allowed to drink all at one time. They can have any additional fluid met with non-sugar containing options.

Tips for Children on the "Classic Ketogenic" Diet

- Most recent formula orders will be in a nutrition note (may be a telephone encounter)
- Children can stay on their sick day plan of Pedialyte for 24-48 hours.
- After 24-48 hours of Pedialyte, a half strength ketogenic plan should be attempted.
- If the half strength plan is tolerated after 24 hours, the full strength plan should be resumed.

Tips for Children on the "Modified Atkins" Diet

- Order a "Ketogenic" in EPIC and provide a menu available in the room for carbohydrate counting.
- They may ask for some special products such as keto formula (provided by the nutrition room) or MCT oil (from pharmacy).
- For sick days, children can receive broth and other non-sugar containing fluids for 24-48 hours. This is addition to Pedialyte (1 L divided into 24 hours).
- After 24-48 hours of sick day plan, children should resume eating protein and vegetables that were a part of their modified ketogenic diet prior to illness. They should NOT be instructed to add back fat at this time.
    - For example: Chicken breast and broccoli
- After 24-48 hours of protein and vegetables, families should then resume adding back extra fat into their child's diet.
    - For example: Chicken breast, broccoli with heavy cream and butter

Managing a child on the ketogenic diet who requires NPO for procedures or surgeries

1. Medications: Must be in the lowest carbohydrate form possible (no chew tabs, elixirs, syrups). Check with the pharmacy before ordering new medications.

2. Intravenous solutions and glucose levels: Use 0.9NS or 0.45NS. Lactated ringers are also carbohydrate-free, however may worsen acidosis. Dextrose solutions should be avoided unless patient has a blood glucose level < 40 mg/dL. If blood glucose drops < 40 mg/dL, give 60 mL D10W bolus and re-check in 30 minutes. If blood glucose still < 40 mg/dL on re-check, give another 60 mL D10W bolus and start D2.5% at maintenance to maintain a stable glucose level (50-70 mg/dL)

3. Sedation: Discontinue the ketogenic diet if **Propofol** is used, or other drugs that impair fatty acid oxidation, must be used.

4. Serum (beta-hydroxybutyrate) ketones: check prior to surgery then re-check afterward. Extended fasting can lead to excessive hyperketosis or and acidosis. Bicarbonate may be added to correct acidosis. Symptoms of hyperketosis include: nausea, lethargy, rapid, shallow breathing, and vomiting. Laboratory indicators of excessive ketosis include low serum CO2. Hyperketosis is unlikely to occur if blood glucose is maintained above 50-80 mg/dL.