ACUTE MANAGEMENT OF ARGININOSUCCINATE LYASE DEFICIENCY (ARGININOSUCCINIC ACIDURIA) AND ARGININOSUCCINATE SYNTHETASE DEFICIENCY (CITRULLINEMIA)

Such patients easily and frequently decompensate with minor infections, poor oral intake, vomiting or constipation. The patient should be admitted immediately to ER and managed as triage level II :
Immediate actions which should be accomplished within 1 hour of arrival :

- Basic life support
- Stop all source of protein central and parenteral nutrition.
- Check GlucoChecks.
- Insert an IV access and take blood as **STAT ORDER** for blood gases, chem 1, Ammonia (NH3). Ammonia should be taken with precaution (without tourniquet, transported on ice to the laboratory, separated within 15 minutes of collection and analyzed immediately. 5) Extract blood for CBC; blood C/S (peripheral and central if patient has central line). Liver profile, bone profile, total protein, albumin, bilirubins, coagulation and lipid profile.
- Start immediately 1 1/2 to double maintenance I.V.F as D10 1/2NS +KCL 30meq/l.
- Give loading dose of L-arginine-HCL 300mg/kg followed by a sustained intravenous infusion of 300 mg/kg L-arginine-HCL.
- Call the pharmacy hotline# to expedite the delivery of medications .
- Re-adjust according to lab results (Keep GlucoChecks 5-8mmol/L). Consider start insulin if hyperglycemia persist > 10 mmol/l at dose of 0.01-0.05 unit/kg/hour and titrate up until blood glucose controlled. Total glucose requirements: 6-8mg/kg/minutes.

- DO NOT decrease dextrose rate or amount and **DO NOT STOP** calorie delivery in the acute stage for any reason.
- Adjust the amount of potassium supplement through IV line according to the potassium level result:
  - ≥5 : No kcl will be added
  - 3.5-4.9: 20 meq/l kcl. If he is on Ammonul : kcl 30 meq/l
  - 2.8-3.5: 40meq/l kcl will be added.
  - <2.8 meq: 0.5meq/kg kcl as a bolus in prediluted solution D5 w over one hour (should be given centrally and patient should be attached to cardiopulmonary monitor during the infusion) or you can give the required dose of kcl through PO/GT if he can tolerate it. KCL can be given through peripheral line up to 60 meq/l, rate must not exceed 0.125meq/kg/hour.
- If ammonia >100, continue on L-arginine-HCL 300mg/kg loading dose and give AMMONUL® (sodium phenylacetate and sodium benzoate) 250 mg/kg over 90 minutes. Followed by a sustained intravenous infusion of L-arginine-HCL 300 mg/kg/day q 6 hours or continuously over 24 hours and AMMONUL® 250mg/kg/day over 24 hours.
- AMMONUL could be given at peripheral line on limited bases define as first 24 hours after hyperammonemia crisis.
- Start intralipid 20% as needed at 2-3 g/kg/day to provide additional calories. Intralipid 20% can be given at peripheral line and can be given at the same line with other medications and KCL .
- Give prophree or polycose (non-protein calorie source) P.O/NGT as tolerated.
- Call pharmacy to expedite the intralipid20% and medications .
- Repeat ammonia, blood gases, chem 1 after the loading dose completed.
- According to clinical evaluation, empirical antibiotics may be started. Ammonia, electrolyte and blood gases need to be followed at regular intervals during this acceleration of management stage.
- DO NOT STOP other oral chronic medications.
- If ammonia <100, Discontinue arginine infusion and continue other therapy including oral chronic medications .
- Proteins should be re-introducing within 24 hours-36 hours of initiation of therapy even if the patients on dialysis .
- Start dialysis if above measures failed to reduce ammonia within 4 hours or if initial ammonia is >500 µmol/L.
- Inform Biochemical Geneticist (Metabolic) on-call, Genetics Division, Department of Pediatrics King Abdulaziz Medical City Tel: 0118011111.

For more information please read the attached guidelines for this disorder.