Author name: Jennifer Jones and John Smith

Disease Name: Vitamin deficiency

Take away learning point - Neurological Implications Vitamin Deficiency in a 5-Year-Old boy with Autism non-verbal and malnutrition. Deficiencies in vitamins B1 and B6, leading to neurological symptoms of lethargy, weakness and could not walk. MRI evaluation of the brain indicates symmetric thalamic hyperintensities suggestive of thiamine hyper-intensities.

Admission Notes:

5 yo boy with history of autism and developmental delay (non-verbal) who transferred from a different hospital for further evaluation per parental preference. In March mom noted abnormal eye movements and he was admitted and had a complete workup that per labs showed vitamin deficiency but per mom with no clear diagnosis. He was recommended to start on formula as due to oral aversion he reportedly only drinks almond milk and no solid food intake, but that was never started as an outpatient due to cost and ability to obtain it at home. Between March and August 12th, mom reports he was generally doing well. He doesn't speak but played with his siblings and could walk/stand. On August 12th mom noted that he wasn't drinking anything and seemed not himself, and so he went to the ED where he was felt to have dehydration, given IV fluids and then sent home with close PCP follow up. The next day he continues to not drink, not act himself and had no wet diapers and so she brought him back to the ED. He was given 3 IV fluid boluses and due to ongoing concerns from mom that he wasn't himself, he was admitted to RB&C floor. On the floor a workup was started and he was noted to be constipated. He was also noted to have significant weight loss since March, although there are discrepancies between scales on how much weight he had lost about 18kg. Within the first 24 hours on the floor he wasn't himself per mom from a neurologic standpoint, his eyes were rolling back in his head, and he then started to desaturate and have lower BPs and was transferred to the ICU. He required intubation during sedation for lines, and was also started on a sepsis rule out. He was initially also on epinephrine and norepinephrine. An echocardiogram was obtained that reportedly showed moderate biventricular dysfunction. The norepi and epi were weaned off and he was started on milrinone and furosemide. There were reportedly even concerns he may need ECMO, although those concerns resolved. He was able to be extubated, and has remained on milrinone 0.5 mcg/kg/min with stable hemodynamics. His infectious rule out was completed with no positive cultures. Mom felt that her concerns were not being listened to so she requested transfer to CCF for further management.

Since arrival to ICU, he has remained hemodynamically stable. He was continued on milrinone 0.5 mcg/kg/min and nipride added for hypertension, since decreased to 0.5. Labs obtained thus far have been reassuring with a normal mixed venous saturation and normal lactate as well as end-organ function. Repeat echo yesterday showed normal right ventricular function, mildly decreased left ventricular function (basal>apex), normal coronary arteries, no valvar concerns, small pericardial effusion. Cardiology was consulted for further management of his heart function, while he undergoes a complete workup under the PICU service with multiple consulting services.

FINDINGS BY SYSTEM:

NEURO: awake, alert; tracking, non-verbal response with audible sounds; hypotonic but moving all extremities

RESPIRATORY: clear breath sounds throughout on auscultation; on RA; breathing comfortably

RENAL / FEN / GI : Abdominal exam: Distended but soft

Progress and consultation notes:

ECHO 8/21/23

1. Normal left ventricular size with normal systolic function (EF = 55.5 %).
2. Borderline global LV stain of -16.3%. Subtle hypokinesis of the lateral wall of the left ventricle base. There is abnormal diastolic filling (E/e' ratio > 10).
3. Qualitatively normal right ventricular size and wall thickness with normal systolic function.
4. Trace mitral valve regurgitation.
5. Left atrium is normal in size.
6. No pulmonary hypertension on the basis of TR gradient.
7. Trivial physiologic anterior pericardial effusion.
8. The prior study for comparison is dated 8/19/2023 . There is interval improvement in LV systolic function. Compared with prior study there has been a significant change.

IMPRESSION: ~~John~~ is a 5 yo male with history of autism and developmental delay (non-verbal), and oral aversion which has lead to a limited diet. He is admitted with nutritional deficiency and hypotonia in setting of Vitamin B1 + B6 deficiency. ~~John~~ has acute systolic heart failure with reported moderate biventricular dysfunction by echo post-respiratory arrest at outside hospital, that has improved to mild left ventricular dysfunction on echocardiogram 8/19. He remains hemodynamically appropriate, tolerating milrinone decrease yesterday. ~~Today~~ we will plan to discontinue his milrinone and transfer to regular nursing floor.

Differential for his dysfunction includes post-arrest vs nutritional deficiency cardiomyopathy, less likely to be underlying primary cardiomyopathy given improvement in short time period and no ventricular dilation.

Ross Class II: No growth failure. Mild tachypnea with feeds in infants and/or Mild diaphoresis with feeds in infants and/or Dyspnea on exertion in older children.

CARDIAC:

-Telemetry, monitor for ectopy and arrhythmias
- Discontinue milrinone
-Repeat echo tomorrow following discontinuation of milrinone to guide whether ACE-I should be initiated
-PRN isradipine for hypertension
-Repeat VBG in AM
-Maintain K>4, Mg>2, iCal>1.2
-Repeat NTproBNP next week

RENAL / FEN / GI :

-Dietician consulted, start oral formula feeds today with close monitoring for refeeding syndrome
-GI consulted
-Refeeding labs per PICU
-Discuss nutritional lab evaluation with GI/Dietician, would recommend full micronutrient and vitamin evaluation

-Continue Vitamin B1 + B6 supplementation
-Strict I&O, consistent daily AM weight; currently off diuretics

Neuro

Subjective

- Interval hx notable for continuation of Kate farms via bottle with nutrition. B1/B6 pending. On thiamine replacement.
- No acute events overnight per mom, she states that he has not been walking for several days prior to presentation.

Sibs:

Brother DOB 2003: out of house
Sister DOB 2009
Sister 2016: reportedly autistic
Twin brother: reportedly also autistic, but can speak more than this patient. Mom states twin is reportedly similar size/growth to this patient.
Sister DOB 2020

Objective

PHYSICAL EXAM:

BP 122/95 | Pulse 111 | Temp (Src) 98.6 (Axillary) | Resp 64 | Ht 3' 2.976" (0.99m) | Wt 31 lb 15.5 oz (14.5kg) | SpO2 100% | BMI 14.79 kg/(m^2).
O2 Therapy: Room Air

GENERAL:
GENERAL: Awake/easily arousable.
HEENT: Normocephalic/atraumatic
RESPIRATORY: Normal respiratory effort.
CARDIOVASCULAR: No lower extremity edema.
GI: Not examined
EXTREMITIES: No cyanosis, clubbing or edema.
SKIN: Skin color, texture, turgor normal. No rashes or lesions.

NEUROLOGIC EXAM:

MENTAL STATUS: Patient is awake, alert. Nonverbal (baseline), tracking but not following commands.
CRANIAL NERVES: PERRL. Extraocular movements intact, nystagmus on lateral gaze bilaterally. Face intact to light touch in V1, V2, and V3 bilat. No facial asymmetry. Hearing grossly intact bilaterally. Gag not examined.
SENSORY: Intact to light touch in face and all four extremities.
MOTOR: Tone is decreased. Sitting up in bed, able to hold bottle in R hand. Legs flexed, not in frog-legged position. Moving all extremities AG.
REFLEXES: Biceps, triceps, brachioradialis 1+. Patellar, and achilles 1+ bilat. Plantar reflex downgoing bilat.

5 yo M with autism, baseline non-verbal who presented to UH on 8/12 due to c/f lethargy, admitted 8/13 with tachycardia/leukocytosis with course c/b heart failure. Intubated 8/16-18 for hypoxia/hypothermia, following extubation noted to be diffusely weak prompting MRI neuro-axis which was notable for symmetric thalamic hyper-intensities.
Recent clinical hx notable for severe malnutrition due to almond milk as sole source of nutrition.
Social:

Mom: single mother with 5 children in household, reportedly 3 autistic.
Mom states twin brother reportedly similar size/growth to this malnourished patient.

Exam:

Nonverbal; does not follow commands
Moves arms and legs symmetrically.
Visually interactive
Difficult to assess in confines of PICU bed

PROBLEM LIST

1) Developmental disability

Due to pt's current medical ICU hospitalization, we can not verify the autism diagnosis at this time.
There is certainly cognitive/intellectual disability.

2) The patient's presentation, imaging findings and clinical scenario are most suggestive of thiamine deficiency. *Also other protein and calorie malnutrition.* Would suggest continuance of aggressive nutritional repletion with continued monitoring for refeeding.

No additional work-up needed from neurology perspective at this time.

RECOMMENDATIONS:

- Continue thiamine replacement, nutritional support and refeeding monitoring

Neurologic: Alert. Self feeding from bottle. Moving legs and arms in bed and comfortable.

Neuro assessment UH prior to admission at CCF: Opens eyes, PERRL, moving RUE spontaneously, bilateral lower extremities weak and difficult to elicit movement on my exam. LUE limited by PICC line and PAL. Able to elicit more movement on Neurology examination. Nonverbal at baseline, moaning, appears disoriented.

The thalami have developed symmetric hyperintensities; given the history of malnutrition this may be related to thiamine deficiency/Wernicke encephalopathy. Viral encephalitis is not excluded.

STUDY:
MRI BRAIN WO; 8/19/2023 1:43 pm

INDICATION:
new onset flaccid paralysis vs severe weakness. Severely affected

with autism spectrum disorder, chronic nutritional deficiency and malnutrition admitted to PICU with mixed cardiogenic and distributive shock secondary to severe malnutrition and metabolic dysfunction with possible infection. Mother noticed decreased patient motion today.

TECHNIQUE:
Axial T2, FLAIR, DWI, gradient echo T2 and sagittal and coronal T1 weighted images of the brain were acquired.

FINDINGS:
CSF Spaces: The ventricles, sulci and basal cisterns are within normal limits. No abnormal extra-axial collection.

Parenchyma: The medial aspects of the thalami have developed symmetric FLAIR and diffusion hyperintensity with minimal if any ADC hypointensity. Otherwise no parenchymal abnormalities are noted. No evidence of intracranial hemorrhage. There is no mass effect or midline shift.

Paranasal Sinuses and Mastoids: Visualized paranasal sinuses and mastoid air cells are clear.

The visualized flow voids are patent.

IMPRESSION:
The thalami have developed symmetric hyperintensities; given the history of malnutrition this may be related to thiamine deficiency/Wernicke encephalopathy. Viral encephalitis is not excluded.

Mri cervical

. Normal MRI of the cervical through lumbar spine.

STUDY:
MRI CERVICAL WO; MRI L-SPINE WO; MRI T-SPINE WO; 8/19/2023 1:43 pm

INDICATION:
new onset flaccid paralysis vs severe weakness .

MRI lumbar

Impression

1. The bladder is markedly distended; the entire bladder was not imaged. There is mild hydronephrosis/hydroureter most likely related to the distended bladder. The bladder does have a bubble of air within it anteriorly.
2. Normal MRI of the cervical through lumbar spine.

STUDY:
MRI CERVICAL WO; MRI L-SPINE WO; MRI T-SPINE WO; 8/19/2023 1:43 pm

TECHNIQUE:
Sagittal T1, T2, STIR, axial T1 and T2 weighted images of the cervical, thoracic, and lumbar spine were acquired.

FINDINGS:
Counting from above, there are 7 cervical, 12 thoracic, and 5 lumbar vertebral bodies with the last well-formed disc labeled L5-S1.

Alignment: The vertebral alignment is maintained.

Vertebrae/Intervertebral Discs: The vertebral bodies demonstrate expected height. The marrow signal is within normal limits. The intervertebral discs also demonstrate normal signal and morphology. No significant degenerative change.

Cord: Normal in morphology and signal intensity. The conus terminates at T12. The cauda equina is unremarkable.

The bladder is markedly distended; the entire bladder was not imaged. The anterior aspect of the bladder has a small amount of air within it possibly from catheterization.

The bladder distension is associated with mild hydroureter and hydronephrosis bilaterally.

MRI thoracic

STUDY:
MRI CERVICAL WO; MRI L-SPINE WO; MRI T-SPINE WO; 8/19/2023 1:43 pm

INDICATION:
new onset flaccid paralysis vs severe weakness .

TECHNIQUE:
Sagittal T1, T2, STIR, axial T1 and T2 weighted images of the cervical, thoracic, and lumbar spine were acquired.

FINDINGS:
Counting from above, there are 7 cervical, 12 thoracic, and 5 lumbar vertebral bodies with the last well-formed disc labeled L5-S1.

Alignment: The vertebral alignment is maintained.

Vertebrae/Intervertebral Discs: The vertebral bodies demonstrate expected height. The marrow signal is within normal limits. The intervertebral discs also demonstrate normal signal and morphology. No significant degenerative change.

Cord: Normal in morphology and signal intensity. The conus terminates at T12. The cauda equina is unremarkable.

The bladder is markedly distended; the entire bladder was not imaged.

The anterior aspect of the bladder has a small amount of air within it possibly from catheterization.

The bladder distension is associated with mild hydroureter and hydronephrosis bilaterally.

GI notes

IMPRESSION:

~~John~~ Patient is a 5 year old, male with Autism spectrum disorder who is being seen in consultation today for evaluation of severe protein-calorie malnutrition in the setting of insufficient caloric intake. Admitted to PICU after transfer from OSH where he presented with lethargy and transferred to OSH PICU where he was intubated for hypoxia and hypothermia for 1 day with evidence of heart failure and MRI brain spine notable for symmetric thalamic hyper-intensities suggestive of thiamine, for which patient was started on thiamine supplementation. He was transferred to CCF PICU due to mom's concerns of not being heard by medical staff. ~~John~~ 's diet consisted of **only almond milk since he was 2 years of age,** as mom was avoiding cow's milk for eczema management, however, oral aversion for solids wasn't addressed with dietary counseling, as mom reports she wasn't able to follow up since it was during the COVID pandemic. He was admitted at an OSH in March and started on Kate Farms a few months ago which mom noticed he was doing really well on but wasn't able to continue after their discharge since they didn't have a prescription and she wasn't able to afford it. Growth chart review and his growth (weight and height) has been stunted since then. His malnutrition is most likely explained by insufficient caloric intake, however, would recommend screening for malabsorption with celiac disease screen and fecal elastase. Plan to coordinate feeding plan with nutrition while closely monitoring for electrolytes with twice daily CMP, Mag and Phos and obtain trace elements and vitamin levels.

RECOMMENDATIONS /PLAN:

-Please obtain thiamine level, Niacin, B6, and B12, Vitamin A and E and trace minerals
- Agree with nutrition plan Kate Farms Pediatric Standard 1.2 orally by providing small volumes throughout the day starting with 2-3 oz q3 hours. If patient unable/unwilling to limit volume, consider enteral nutrition support for continuous feeds.
- Obtain BID CMP, Mag and Phos to monitor for refeeding syndrome
- Start Miralax 1/2 daily for constipation
- SW consult

Thank you for this consult. We will continue to follow along with you.

Rehab notes:

~~John~~ is a 5yo young man with complaints of weakness seen for initial physiatry consultation at the request of medicine service to manage rehabilitation needs.

RECOMMENDATIONS:

5yo young man with severe malnutrition and B12 deficiency resulting in bithalamic hyper-intensitives
Intensive inpatient rehabilitation when medically ready.
Impairments: weakness
Causing deficits in: mobility, self care, age appropriate development, feeding

Given his significant decline in function, he is most appropriate for intensive inpatient rehabilitation to receive 3 hours of therapies at minimum daily with goal to improve his function and mobility and return home and to preschool. I explained to mom that the goal of intensive therapies is to improve his functioning faster than if he received outpatient therapies at a lower frequency.

Mom reports that she is confident that she can take care of ~~John~~ physically at home and the baby sitter can as well. If she chooses to discharge home, then would recommend outpatient PT, OT, and SLP three times a week. However given his significant change in his gross motor functioning and his longstanding history of oral aversion, I think it is prudent to focus on his motor progress with PT and OT 3x/week and then as his PT needs lesson to add speech therapy in those spots instead. His oral aversion is long-standing and will take months to progress.

Recommend outpatient follow up with pediatric PM&R in 3 months to monitor his progress in therapy.

Recommend evaluation in behavioral feeding clinic.

History of present illness:

~~John~~ is a 5yo young man with history of autism and oral aversion who presented with change in mental status found to be severely malnourished, only drinking almond milk from bottle. He was found to have heart failure and hypoxia requiring intubation. MRI reportedly with symmetric thalamic hyper-intensities. He was able to be extubated but continues to have severe hypotonia and is below his functional baseline. He remains admitted for concerns for refeeding syndrome, now on kate farms formula with vitamin supplementation, but is now taking all feeds via bottle. He is getting daily labs for refeeding monitoring.
Mom is at bedside and feels his strength is improving, today he was able to sit with her for 60 seconds without her touching him before he started to lean and slump. She reports he has good head control.
She feels that she is able to take care of him at home with his current physical status. She can carry him up the stairs, and she has spoken to the babysitter who has agreed they can carry him. She hasn't been able to speak to preschool as it doesn't start until next week.

Current function:
OT 8/23: total A for self care, maxA rolling, max A supine to sit, Total A sit to stand with minimal WB through b/l LE.
PT 8/23: Mod A supine to sit, Mod A sit-stand. Static sitting balance good, static standing balance poor, requires mod-maxA.

Premorbid function:
Ambulatory. Non-verbal. Drinks from bottle only. Received PT, OT, and SLP through preschool. Not toilet trained.

Lives with mom in a 2 story home with 4 steps to enter. There is a bedroom on the 1st floor
School: preschool, has IEP and receives PT, OT and SLP at school.

BP 114/70 | Pulse (!) 145 | Temp 36.8 °C (98.3 °F) (Axillary) | Resp 24 | Ht 99 cm (3' 2.98") | Wt 14.5 kg (31 lb 15.5 oz) | SpO2 100% | BMI 14.79 kg/m² General Appearance: Well developed, well nourished, in NAD
HEENT: normocephalic, atraumatic, EOMI
Skin: Intact in limbs without rashes or breakdown
Chest: Breathing comfortably, equal chest expansion, no respiratory distress
Cardiovascular: Regular rate, good perfusion, extremities warm and well perfused
Abdomen: Soft, non distended, non tender
MSK: No edema. Good perfusion. No color or temperature change
Neurologic: Alert. Self feeding from bottle. Moving legs and arms in bed and comfortable.

HPI
~~John~~ is a 5 y/o male with history of autism who presented to an outside hospital ED on 8/12 with lethargy, and decreased PO intake. He was given a fluid bolus and a CBC was obtained with no leukocytosis so he was discharged home. The following day mom brought him back to the ED again for poor PO intake, she reported that he hadn't taken any PO for two days, decreased urine output, and fever. He was tachycardic to the 150's and WBC count was 14. He was given a total of 3 IV fluid boluses and ceftriaxone and was admitted to the RNF at Rainbow Babies and Children's Hospital. He was found to be severely malnourished with a 23% wt loss in 5 months. Mom reported that he is on an exclusive almond milk diet with no other PO intake. Nutrition was consulted and he was started on Kate Farms NG feeds and vitamin B supplementation with close monitoring due to concerns for refeeding syndrome. He had increasing abdominal distention with a KUB showing large stool burden with nonobstructive pattern. Pediatric surgery team was consulted and he was started on a bowel regimen, including enemas and suppositories. Abdominal US was obtained showing moderate ascites.

On 8/16 he became hypothermic and hypoxic with oxygen saturations in the 70's so he was transferred to the ICU where he was intubated. During that time he became acutely hypotensive so central lines were placed and he was started on a epinephrine and norepinephrine infusions. An echocardiogram was obtained showing moderate bi-ventricular dysfunction (see epic for full report) so epi and norepi were weaned off and a milrinone infusion was started. Septic work up was negative, he was placed on cefepime, vancomycin, and flagyl for a 48hr r/o (8/16-8/18). He was successfully extubated on 8/18. This morning he developed weakness in his lower extremities bilaterally, neurology was consulted and an MRI of the brain and spine were obtained showing hyperitensities in the medial thalamus that may be related to thiamine deficiency, and a normal spine. Additionally, today mom requested a transfer to CCF because she was dissatisfied with his care and felt like she was not being heard.

He arrived to the PCICU in stable condition on RA and a milrinone infusion. He was hypertensive with MAP's in the low 100's so he was started on a nicardipine infusion. Labs, KUB, EKG and Echocardiogram were obtained. Preliminary echo read showed mild LV dysfunction with hypokinetic posterior wall motion, normal RV function, no valve regurgitation and EF of 45%. Mom reported that his weakness and poor PO intake started in the week prior to his hospital admission. She stated that before that he was in his usual state of health, running, jumping and playing. He was drinking well, although she did report that he exclusively drinks almond milk and has never taken any solid foods.

Recent history of travel: No
Contact with sick person: No
Recent immunizations: No
Birth History:

PEDIATRIC HISTORY
Gestational age: 38 wks
Delivery method: C-Section, Other
Apgar scores: One: 9 Five: 9
Birth weight: 3019 g (6 lb 10.5 oz)
Discharge weight: N/A
Length: 50.8 cm (20")
HC: N/A
Feeding method: Bottle Fed - Formula
Additional comments:
Hearing Screening Left: completed on 08/18/2018 Result: Passed ABR METHOD
Hearing Screening Right: completed on 08/18/2018 Result: Passed ABR METHOD
PKU: completed on 8/20/18.WNL

REVIEW OF SYSTEMS

Review of Systems

Constitutional: Positive for decreased appetite, malaise/fatigue and weight loss.
HENT: Negative.
Eyes: Negative.
Cardiovascular: Negative.
Respiratory: Negative.
Endocrine: Negative.
Hematologic/Lymphatic: Negative.
Skin: Negative.
Musculoskeletal: Positive for muscle weakness.
Gastrointestinal: Positive for bloating and constipation.
Genitourinary: Negative.
Neurological: Positive for weakness.
Psychiatric/Behavioral: Negative.
Allergic/Immunologic: Positive for environmental allergies.

Physical Examination

On my physical exam patient is awake, alert, both pupils are round and reactive to light symmetrically, moves all extremities, weak motor strength in all extremities.
normal S1 and S2, no murmur, no gallop, warm extremities, normal peripheral pulses, not in respiratory distress, in room air, good air entry bilaterally in lungs, Abdomen is soft, non-tender, distended, no hepatosplenomegaly

Assessment/Plan

~~John~~ is a 5y/o male with history of autism and malnutrition admitted to the OSH with lethargy and poor PO intake found to have moderate bi ventricular dysfunction on echo after an acute respiratory failure and hypotensive event. He was transferred to CCF PCICU at the request of

his mother. Echocardiogram, EKG, x-ray and labs were obtained. We plan to continue his milrinone infusion and start nicardipine for hypertension and monitor his hemodynamics closely. The rest of the plan is detailed below.

Discharge notes:

Hospital Course:

~~John~~ is a 5 y/o twin male with history of autism who presented to *Asthabula County Medical Center* ED on 8/12 with lethargy, and decreased PO intake found to have severe malnutrition and B vitamin deficiency. Mom reported that he is on an exclusive almond milk diet with no other PO intake. Nutrition was consulted and he was started on Kate Farms NG feeds and vitamin B supplementation with close monitoring due to concerns for refeeding syndrome.

He had increasing abdominal distention with a KUB showing large stool burden and gaseous distention with nonobstructive pattern. Pediatric surgery team was consulted and he was started on a bowel regimen, including enemas and suppositories. Abdominal US was obtained showing moderate ascites. On 8/16 he became hypothermic and hypoxic with oxygen saturations in the 70's and was transferred to the ICU where he was intubated and started on epi and norepi drips**.** An echocardiogram was obtained showing moderate bi-ventricular dysfunction (see epic for full report) and he was transitioned to milrinone. He completed a 48H sepsis rule-out **on** cefepime, vancomycin, and flagyl (8/16-8/18). He was successfully extubated on 8/18. On 8/19 he developed weakness in his lower extremities bilaterally, neurology was consulted and an MRI of the brain and spine were obtained showing hyperitensities in the medial thalamus that may be related to thiamine deficiency, and a normal spine.

CCF COURSE

Per mom's request on 8/19, he was transferred to the **CCF** PCICU in stable condition on RA and a milrinone infusion. He was hypertensive with MAP's in the low 100's so he was started on a nicardipine infusion. Preliminary echo read showed mild LV dysfunction with hypokinetic posterior wall motion, normal RV function, no valve regurgitation and EF of 45%. Milrinone was discontinued and he was transferred to the RNF on 8/21.

He remained hemodynamically and clinically stable. His echo progressively improved with a final read as a normal EF at 56%. He was started on b1 and b6 vitamin supplementation (treatment)and was monitored for refeeding syndrome without significant electrolyte abnormalities**.** His distension was progressively improved with simethicone and a bowel regimen for constipation. He was also seen by our swallow specialists for his oral aversion and they recommended outpatient feeding clinic treatment. He was also seen by occupational and physical therapy who provided therapies while inpatient to improve his acute on chronic hypotonia and deconditioning. Notably, he had improving mild to moderate gaseous bowel distention ad discharge 2/2 paresis from sedation medications and intubation.

He will require outpatient proBNP in 1 week with cardiology follow-up in 2-3 weeks; repeat echo and ekg will be performed at that time.

Transitions of Care Critical Issues:
SPECIALIST FOLLOW-UP: Cardiology for monitoring of resolution of heart failure PT, OT, Physical medicine and rehab, Nutrition, feeding clinic,
Developmental *Pediatrics*

New medications: Please give ~~John~~ his Kate farms formula for management of his malnutrition as welll as B1 and B6 supplements. Simethicone can be given for gas. Miralax can be given up to twice daily for constipation

PAIN: None
GENERAL: Well developed, not in acute distress, continues to make short vocalizations upon entry into his room
SKIN: Negative
HEAD: Normocephalic
EYES: Normal conjunctiva
MOUTH & THROAT: Normal and Moist mucous membranes
NECK: Normal, supple with no adenopathy.
PULMONARY: Lungs CTA bilat, Unlabored breathing, and Good air movement
CARDIOVASCULAR: Regular Rate and Rhythm without murmurs or clicks.
ABDOMEN: Abdomen is soft, non-tender; BS normal and there are no masses or organomegaly
NEUROLOGICAL: Non-focal, non-verbal at baseline, some hypotonia present however improved from admission
The remainder of the physical exam is noncontributory.

Discharge Medications:

Medication List

START taking these medications

GAS RELIEF 80 (SIMETHICONE) 80 mg chewable tablet
Generic drug: simethicone, chewable
Take half tablet by mouth four times daily as needed (for gas).

M-PAP 160 mg/5 mL liquid
Generic drug: acetaminophen
Take 4.5 mL by mouth every 6 hours as needed for fever or pain. Do not exceed 5 doses in 24 hours.

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polyethylene glycol 3350 17 gram packet
Take a half Packet by mouth once daily as needed for constipation. Dissolve dose in 4 - 8 ounces of liquid and take as directed.

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thiamine 50 mg tablet
Commonly known as: VITAMIN B1
Take half tablet by mouth once daily.

VITAMIN B-6 25 mg tablet
Generic drug: pyridoxine (vitamin B6)
Take 1 tablet by mouth once daily.

CONTINUE taking these medications

* **albuterol** 2.5 mg /3 mL (0.083 %) nebulizer solution Commonly known as: PROVENTIL
Use 3 mL via nebulizer every 4 hours as needed for Wheezing/Shortness of Breath.

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* **albuterol HFA** 90 mcg/actuation inhaler
Commonly known as: PROVENTIL HFA, VENTOLIN HFA
INHALE 2 PUFFS BY MOUTH EVERY 4 HOURS AS NEEDED

Aquaphor OriginaL 41 % topical ointment
Generic drug: white petrolatum
Apply 1 application to affected area as needed.

Children's ZyrTEC Allergy 1 mg/mL syrup
Generic drug: cetirizine

Pedialyte Soln
Commonly known as: PEDIALYTE
Take 200 mL by mouth as needed (with vomiting or loose stools) for up to 5 days.

Pediatric multivitamin chewable chewable tablet
Commonly known as: ANIMAL SHAPE VITAMINS
Take 1 tablet by mouth once daily.

Active Hospital Problems

Diagnosis	Date Noted
• Heart failure (HCC)	08/19/2023
• Receiving inotropic medication	08/20/2023
• Severe protein-calorie malnutrition (HCC)	08/20/2023
• Vitamin B1 deficiency	08/20/2023
• Brain disorder due to vitamin deficiency	08/20/2023
• Central venous catheter in place	08/20/2023
• On total parenteral nutrition (TPN)	08/20/2023
• Primary hypertension	08/20/2023
• Autism spectrum disorder requiring very substantial support (level 3)	05/19/2020

DIAGNOSES:
Autism Spectrum Disorder Requiring Very Substantial Support (Level 3)
Avoidant-Restrictive Food Intake Disorder (Arfid)

Problems

EXP. ADMIT/ DEHYDRATION

Status: Inactive

Comments: EXP. ADMIT/ DEHYDRATION

DEHYDRATION

Comments: DEHYDRATION

Abdominal distension (gaseous) (787.3)
Hyponatremia (276.1)
Hypocalcemia (275.41)
Hypomagnesemia (275.2)
Sepsis (038.9)
Malnutrition, calorie (263.9)
Nystagmus (379.50)
Abdominal distension (787.3)
Shock (785.50)
Cardiac dysfunction (427.9)
Weakness (780.79)

Medical History:

PAST MEDICAL HISTORY

PAST MEDICAL HISTORY

Diagnosis	Date
• Atopic eczema	
• Autistic disorder	
• Other ascites	
• Respiratory failure with hypoxia (HCC)	
• Sepsis (HCC)	

Surgical History:

PAST SURGICAL HISTORY

No past surgical history on file.

Family History:

FAMILY HISTORY

FAMILY HISTORY

Problem	Relation	Age of Onset
• other Brother (twin)		

Social History:

SOCIAL HISTORY

Social History

Tobacco Use	
• Smoking status:	Never
• Smokeless tobacco:	Never
Substance Use Topics	
• Drug use:	Never

LIVES WITH: Mother and 6 Siblings including twin brother.

Development: Developmental delay global, autistic, nonverbal

Immunizations:
Immunization History
Administered Date(s) Administered
diphtheria tetanus pertussis-Haemophilus influenzae b-poliovirus (DTaP-Hib-IPV) vaccine (PENTACEL)
12/03/2018 03/04/2019 06/04/2019
07/01/2020
hepatitis A (HepA) vaccine, 2-dose series, ped/adol (HAVRIX-PEDS, VAQTA-PEDS)
10/30/2019 07/01/2020
hepatitis B (HepB) vaccine, 3-dose series, age 0 yr - 19 yr (ENGERIX B-PEDS, RECOMBIVAX HB-PEDS)
08/18/2018 12/03/2018 03/04/2019
influenza (IIV4) vaccine, age 6 mo - 64 yr, quadrivalent, PF (AFLURIA, FLUARIX, FLULAVAL, FLUZONE)
10/30/2019 10/06/2021
measles mumps rubella (MMR) vaccine (M-M-R II, PRIORIX)
10/30/2019
measles mumps rubella varicella (MMRV) vaccine (PROQUAD)
10/06/2021
pneumococcal (PCV13) vaccine, 13 valent (PREVNAR 13)
12/03/2018 03/04/2019 06/04/2019
10/30/2019
rotavirus (RV1) vaccine, 2-dose series, monovalent, oral (ROTARIX)
12/03/2018 03/04/2019
varicella (VAR) vaccine (VARIVAX)
10/30/2019
Are not up to date

Medications:
Prescriptions Prior to Admission
cetirizine (CHILDREN'S ZYRTEC ALLERGY) 1 mg/mL syrup, Take 2.5 mg by mouth once daily., Disp: , Rfl:
albuterol HFA (PROVENTIL HFA, VENTOLIN HFA) 90 mcg/actuation inhaler, INHALE 2 PUFFS BY MOUTH EVERY 4 HOURS AS NEEDED, Disp: 18 g, Rfl: 2
Pedialyte (PEDIALYTE) soln, Take 200 mL by mouth as needed (with vomiting or loose stools) for up to 5 days., Disp: 2000 mL, Rfl: 0
pediatric multivitamin without iron chewable (ANIMAL SHAPE VITAMINS) chewable tablet, Take 1 tablet by mouth once daily., Disp: 30 tablet, Rfl: 11
albuterol (PROVENTIL) 2.5 mg /3 mL (0.083 %) nebulizer solution, Use 3 mL via nebulizer every 4 hours as needed for Wheezing/Shortness of Breath., Disp: 75 Vial, Rfl: 1
white petrolatum (AQUAPHOR ORIGINAL) 41 % topical ointment, Apply 1 application to affected area as needed., Disp: 396 g, Rfl: 1
ofloxacin (OCUFLOX) 0.3 % ophthalmic solution, Use 1-2 Drops in both eyes every 6 hours., Disp: 1 Bottle, Rfl: 0

Prior to admission medications were reviewed.(history)

Allergies:
ALLERGIES

ALLERGIES

Allergen	Reactions
•Milk	GI Upset

Nutrition notes:

Psychology notes:

REASON FOR REFERRAL: ASD/ARFID

INFORMANTS: Mother, Medical team

HISTORY OF PRESENTING ILLNESS

~~John~~ is a 5-year-old male with history of autism spectrum disorder (level 3) and malnutrition admitted from OSH with lethargy and poor PO intake found to have moderate bi ventricular dysfunction on echo after an acute respiratory failure and hypotensive event.

Introduced psychology services in the context of the PICU. Mother was receptive and engaged in evaluation. Discussed patient history. Mother shared narrative of ~~John~~ 's previous hospitalizations at RBC and frustrations with their experience/communication with the medical team. Shared of financial stressors and worries about being able to access interventions for ~~John~~ in their area. Mother reported history of tried and failed interventions for ~~John~~. She is open to further education and resources.

BIRTH AND DEVELOPMENT HISTORY

Pregnancy/Delivery: full term, cesarean section
Milestones Achieved: global developmental delay, nonverbal

BEHAVIORAL HEALTH HISTORY

PSYCHIATRIC HISTORY:

- **Prior Diagnoses**: Autism Spectrum Disorder
- **Therapist**: No prior therapist
- **Psychiatrist**: No prior psychiatrist
- **Medication trials**: None
- **Psychiatric admissions**: Mother denied a history of psychiatric admissions for ~~John~~.
- **DCFS Involvement**: Mother reported that providers at previous hospital (RBC) filed a report with DCFS after ~~John~~ 's admission due to concerns about malnutrition/potential neglect when she requested to transfer from RBC to CCF. Reported that the case worker should be stopping by tomorrow morning to interview mother on the floors.

PSYCHIATRIC REVIEW OF SYSTEMS:

- **Mood/Irritability**: Mother did not report any concerns regarding ~~John~~ 's mood or anxiety.

- **Sleep**: Mother denied concerns about ~~John~~ 's sleep at home. Reported that he had trouble sleeping last night at the hospital.
- **Eating/Appetite**: ~~John~~ reportedly only ingests liquids that are white out of a bottle (e.g., almond milk, protein powder w/ almond milk). Mother reported that he is intolerant to dairy. She stated that he asks for bottles "all day" and gets "upset" when his bottle is not full enough. Shared that she understands now that ~~John~~ requires certain nutrients (e.g., reported that she was unaware of his vitamin deficiency) but is wondering about how she will be able to get him the appropriate nutrition with his restrictions and financial barriers.
- **Diet/Nutrition**: ~~John~~ is currently malnourished per medical record.
- **Toileting/Hygiene**: ~~John~~ wears a diaper.
- **Behavior/Conduct**: ~~John~~ denied significant concerns related to disruptive behavior.

ASSESSMENT/PLAN:
~~John~~ is a 5-year-old male with history of autism spectrum disorder (level 3) and malnutrition admitted from OSH with lethargy and poor PO intake found to have moderate bi ventricular dysfunction on echo after an acute respiratory failure and hypotensive event. ~~John~~ was referred to the consulting psychology service due to his history of ASD and family stressors. ~~John~~ presents with a significantly restricted diet that is consistent with ARFID secondary to ASD. Family endorses significant stressors and experiencing barriers to care (e.g., low resource area, financial limitations). The family was able to clarify information as needed and reported an understanding of the diagnosis and treatment plan as outlined below.

1. Discussed diagnosis of ARFID and provided education to Mother about ARFID in the context of ASD - provided handouts regarding ARFID.
2. Patient would highly benefit from an intensive, multidisciplinary feeding program; however, due to single parent income and distance from any formal feeding centers, this may not be logistically possible. If this is not possible, Pt would highly benefit from continuing with outpatient PT, OT, speech, and feeding therapy. Recommend connecting with an ABA therapist or outpatient psychologist to assist with food exposures.
3. Recommend that family continue to connect with SW to acquire resources. SW contacted mother during evaluation.
4. Psychology will continue to follow throughout admission to provide support/facilitate communication with the medical team.

HPI plan

Malnutrition: Severe Protein Calorie Malnutrition POA: Yes

PLAN
CNS
-neurochecks q1h and prn changes
-Consult neurology

RESP
-Maintain POX >93%, continuous pox
-CXR on arrival
-ABG on arrival and q4hrs prn
-VBG now

CVS
-continuous cardiorespiratory monitor, q1h VS per PICU routine
-milrinone 0.5 mcg/kg/min
-nicardipine titrate to maintain MAPS 80-90
-ECHO and EKG on arrival
-Heart Function Team consult in AM

FEN/GI
-Diet NPO
-IVF D20NS @ 80% maintenance
-Pepcid BID GI prophylaxis
-Thiamine 25 mg, pyridoxine 20 mg q24hrs
-HOLD multivitamin (PO)
-KUB on arrival
-NG to LIWS
-CMP, Mg, Phos on arrival
-Consult gastroenterology

RENAL
-Strict I&Os
-Continue IV lasix 1mg/kg q6

HEME/ID
-monitor fever curve
-No systemic anticoagulation needed at this point, EF low normal

LINES/TUBES/RESTRAINTS
-Femoral TL CVL
-L arm PICC
-R radial Aline

History: Admitted to PCICU from RBC hospital with diagnosis of myocardial dysfunction secondary to Vit B1 deficiency. The hospital course is as detailed above.