Nutritional Management of the Pre- and Post-Kidney Transplant Pediatric Patient

Pirayeh Pedarsani, MS, RD

September 13, 2019

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Disclosures and Objectives

- **Disclosures - none to report**
- **Objectives:**
  - **To understand the goals of nutrition management and nutritional needs for the pre- and post- kidney transplant pediatric patient**
  - **To understand role of the pediatric RD as part of the transplant team**
  - **To identify the criteria used for selection of a potential kidney transplant pediatric recipient**
  - **To gain understanding of short and long term complications and therapy for post-kidney transplant pediatric recipients**

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Pre-Transplant (Recipient)

- **Goals/Focus of nutrition management:**
  - **Prevention and treatment of malnutrition**
  - **Help minimize post-transplant morbidity due to poor nutritional status and/or non-compliance**

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Role of the Pediatric RD

- **Assessment of nutritional status**
- **Assessment of dietary & medication compliance**
- **Identification of those candidates in need of more intensive nutritional support and monitoring**
- **Education on pre- and post-transplant dietary guidelines**

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Pre-Transplant Clinic Procedure (Pediatric Recipient)

- **All pediatric renal patients screened by RD the week of clinic for full pre-transplant assessment (patients <15 years old seen by peds RD, teens > 15 years old seen by adult RD)**
- **Nutrition screening is documented in the EMR (we use EPIC)**
- **A separate nutrition assessment is also completed and documented in EPIC**

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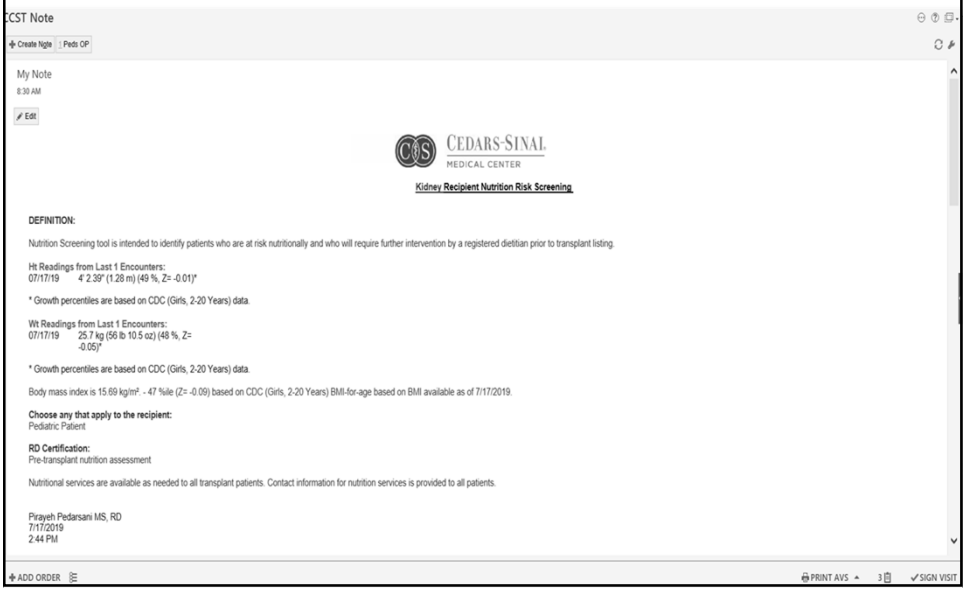
Pre-Transplant Clinic Procedure (Pediatric Recipient)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MEDICAL CENTER

Kidney Recipient Nutrition Risk Screening

DEFINITION:

Nutrition Screening tool is intended to identify patients who are at risk nutritionally and who will require further intervention by a registered dietitian prior to transplant listing.

Ht Readings from Last 1 Encounters:
07/17/19 4' 2.39" (1.28 m) (49 %, Z= -0.01)*

* Growth percentiles are based on CDC (Girls, 2-20 Years) data.

Wt Readings from Last 1 Encounters:
07/17/19 25.7 kg (56 lb 10.5 oz) (48 %, Z= -0.05)*

* Growth percentiles are based on CDC (Girls, 2-20 Years) data.

Body mass index is 15.69 kg/m² - 47 %ile (Z= -0.09) based on CDC (Girls, 2-20 Years) BMI-for-age based on BMI available as of 7/17/2019.

Choose any that apply to the recipient:
Pediatric Patient

RD Certification:
Pre-transplant nutrition assessment

Nutritional services are available as needed to all transplant patients. Contact information for nutrition services is provided to all patients.

Pirayeh Pedarsani MS, RD
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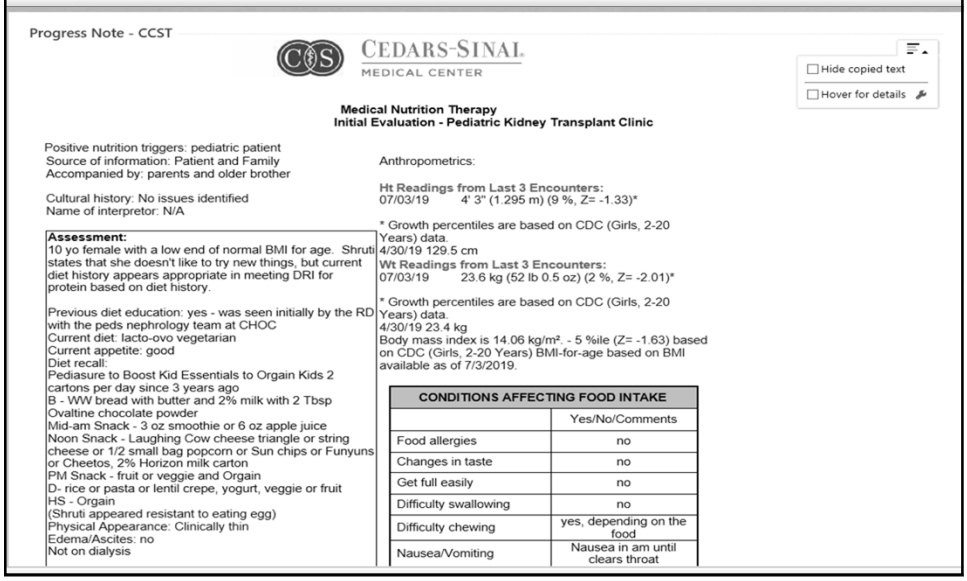
Pre-Transplant Clinic Procedure (Pediatric Recipient)



Progress Note - CCST

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Medical Nutrition Therapy
Initial Evaluation - Pediatric Kidney Transplant Clinic

Positive nutrition triggers: pediatric patient
Source of information: Patient and Family
Accompanied by: parents and older brother

Cultural history: No issues identified
Name of interpretor: N/A

Assessment:
10 yo female with a low end of normal BMI for age. Shruti states that she doesn't like to try new things, but current diet history appears appropriate in meeting DRI for protein based on diet history.

Previous diet education: yes - was seen initially by the RD with the peds nephrology team at CHOC
Current diet: lacto-ovo vegetarian
Current appetite: good
Diet recall:
Pediasure to Boost Kid Essentials to Orgain Kids 2 cartons per day since 3 years ago
B - WW bread with butter and 2% milk with 2 Tbsp Ovaltine chocolate powder
Mid-am Snack - 3 oz smoothie or 6 oz apple juice
Noon Snack - Laughing Cow cheese triangle or string cheese or 1/2 small bag popcorn or Sun chips or Funyuns or Cheetos, 2% Horizon milk carton
PM Snack - fruit or veggie and Orgain
D- rice or pasta or lentil crepe, yogurt, veggie or fruit
HS - Orgain
(Shruti appeared resistant to eating egg)
Physical Appearance: Clinically thin
Edema/Ascites: no
Not on dialysis

Anthropometrics:

Ht Readings from Last 3 Encounters:
07/03/19 4' 3" (1.295 m) (9 %, Z= -1.33)*

* Growth percentiles are based on CDC (Girls, 2-20 Years) data.
4/30/19 129.5 cm

Wt Readings from Last 3 Encounters:
07/03/19 23.6 kg (52 lb 0.5 oz) (2 %, Z= -2.01)*

* Growth percentiles are based on CDC (Girls, 2-20 Years) data.
4/30/19 23.4 kg
Body mass index is 14.06 kg/m². - 5 %ile (Z= -1.63) based on CDC (Girls, 2-20 Years) BMI-for-age based on BMI available as of 7/3/2019.

CONDITIONS AFFECTING FOOD INTAKE	
	Yes/No/Comments
Food allergies	no
Changes in taste	no
Get full easily	no
Difficulty swallowing	no
Difficulty chewing	yes, depending on the food
Nausea/Vomiting	Nausea in am until clears throat

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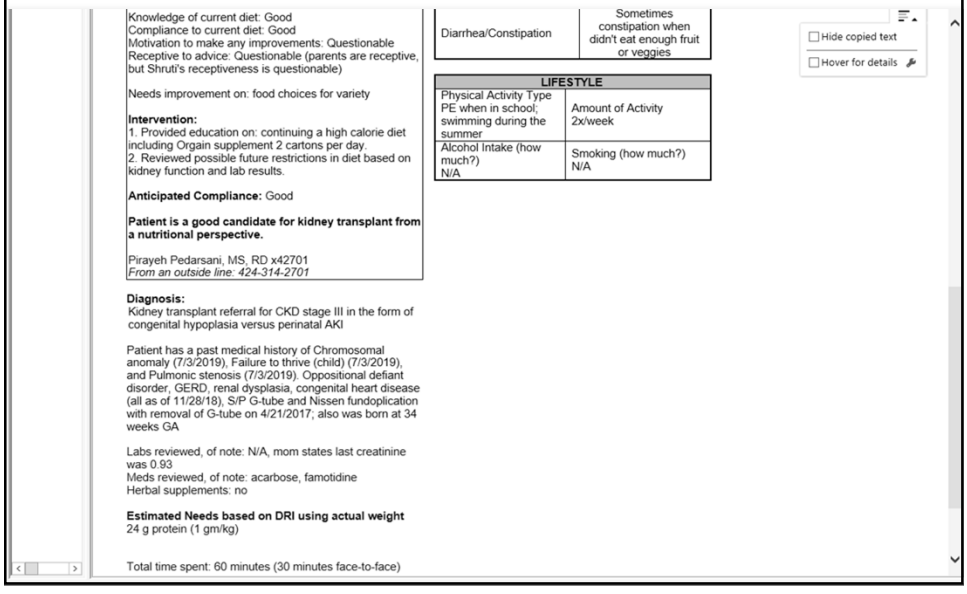
Pre-Transplant Clinic Procedure (Pediatric Recipient)



Knowledge of current diet: Good
Compliance to current diet: Good
Motivation to make any improvements: Questionable
Receptive to advice: Questionable (parents are receptive, but Shruti's receptiveness is questionable)

Needs improvement on: food choices for variety

Intervention:
1. Provided education on: continuing a high calorie diet including Orgain supplement 2 cartons per day.
2. Reviewed possible future restrictions in diet based on kidney function and lab results.

Anticipated Compliance: Good

Patient is a good candidate for kidney transplant from a nutritional perspective.

Pirayeh Pedarsani, MS, RD x42701
From an outside line: 424-314-2701

Diagnosis:
Kidney transplant referral for CKD stage III in the form of congenital hypoplasia versus perinatal AKI

Patient has a past medical history of Chromosomal anomaly (7/3/2019), Failure to thrive (child) (7/3/2019), and Pulmonic stenosis (7/3/2019). Oppositional defiant disorder, GERD, renal dysplasia, congenital heart disease (all as of 11/28/18), S/P G-tube and Nissen fundoplication with removal of G-tube on 4/21/2017; also was born at 34 weeks GA

Labs reviewed, of note: N/A, mom states last creatinine was 0.93
Meds reviewed, of note: acarbose, famotidine
Herbal supplements: no

Estimated Needs based on DRI using actual weight
24 g protein (1 gm/kg)

Total time spent: 60 minutes (30 minutes face-to-face)

Diarrhea/Constipation	Sometimes constipation when didn't eat enough fruit or veggies

LIFESTYLE	
Physical Activity Type PE when in school; swimming during the summer	Amount of Activity 2x/week
Alcohol Intake (how much?) N/A	Smoking (how much?) N/A

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Pre-transplant (Pediatric Recipient)

- **Nutrition Assessment for Pediatric Patients Includes:**
  - Height, Weight, BMI with %iles and Z-scores from the EMR Growth Chart
  - Diet (24-hour recall)
  - Identification of changes in appetite, GI symptoms (nausea, vomiting, diarrhea, constipation)
  - Level of physical activity
  - Medical history
  - Labs
  - Medication, Vitamins & Minerals/Supplements
  - Physical assessment (fat stores, muscle tone or weakness, any signs of muscle depletion and wasting)
  - Evaluation of patient's/caregiver's compliance and readiness for change

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Note on Malnutrition in Pediatric Candidates

- **Potential pediatric renal transplant recipients with a weight for length (< 2 years) or BMI for age (>= 2 years) and Z-score of < 2 SD need diet intervention prior to transplant**
  - **Options:**
    - **If receiving formula, increase concentration with powder or additives, such as protein powder, oil, or glucose polymers**
    - **Add fat to foods (i.e. oil, butter, and/or avocado if not hyperkalemic)**
    - **Appetite stimulant (in consultation with physician)**
    - **Consider G-tube placement if unable to meet estimated needs orally**

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Note on Obese Pediatric Candidates

- **Obese pediatric renal transplant recipients (BMI for age ≥ 95th %ile and/or Z score > 2 SD) are associated with:**
  - **Higher rates of delayed graft function**
  - **Higher rates of surgical complications including wound infections**
  - **Prolonged post-transplant hospital stay**
  - **Higher incidences of post-transplant diabetes mellitus**
  - **Increased immunological graft losses and decreased graft survival associated with higher mortality rates**
- **At CSMC, the pediatric surgeon will assess abdominal fat distribution to determine candidacy**

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Post-transplant Recovery Phase

- **Goals for Nutrition Management:**
  - **To provide adequate nutrients to meet each patient's individual needs**
  - **To promote normal growth and weight gain**
  - **To promote wound healing**
  - **To prevent infection**
  - **To minimize side effects of medications**

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Post-transplant Recovery Phase- Nutrient Needs

Nutrient	Recommendations
Calories	**Equations to Estimate Energy Requirements for Children at Healthy Weights** Age Estimated Energy Requirement (EER) (kcal/d) x 1.2-1.5 = Total Energy Expenditure + Energy Deposition 13-35 mo EER = [89 x weight (kg) - 100] + 20 3-8 y Boys: EER = 88.5 - 61.9 x age (y) + Activity factor x [26.7 + weight (kg) + 903 x height (m)] + 20 Girls: EER = 135.3 - 30.8 x age (y) + Activity factor x [10 x weight (kg) + 934 x height (m)] + 20 9-18 y Boys: EER = 88.5 - 61.9 x age (y) + Activity factor x [26.7 weight (kg) + 903 x height (m)] + 25 Girls: EER = 135.3 - 30.8 x age (y) + Activity factor x [10 x weight (kg) + 934 x height (m)] + 25

Food and Nutrition Board: Dietary reference intakes for energy. Washington, DC, National Academies, 2002

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Post-transplant Recovery Phase- Nutrient Needs

Nutrient	Recommendations
Calories	**Equations to Estimate Energy Requirements for Children Ages 3 to 18 Years Who Are Overweight** Age Weight Maintenance Total Energy Expenditure (TEE) in Overweight Children 3-18 y Boys: TEE = 114 - [50.9 x age (y)] + Activity Factor x [19.5 x weight (kg) + 1161.4 x height (m)] Girls: TEE = 389 - [41.2 x age (y)] + Activity Factor x [15.0 x weight (kg) + 701.6 x height (m)]

Food and Nutrition Board: Dietary reference intakes for energy. Washington, DC, National Academies, 2002

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Post-transplant Recovery Phase- Nutrient Needs

Nutrient	Recommendations
Protein	DRI (Daily Recommended Intake) x 1.2 DRI 1-3 y 1.05 4-13 y 0.95 14-18 y 0.85

Food and Nutrition Board: Dietary reference intakes for protein. Washington, DC, National Academies, 2002

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Post-transplant Recovery Phase- Nutrient Needs

- **Increase intake of phosphorus**
  - Blood phosphorus levels may fall too low after kidney transplant
  - Consuming high-phosphorus foods such as milk, yogurt, cheese will help to maintain normal blood phosphorus levels
  - May also need to give a phosphate supplement (PhosNaK) acutely until level normalizes

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Medications

Medication	Possible Side Effects
Tacrolimus	Hyperglycemia, hyperkalemia, HTN; hypomagnesemia
Sirolimus	Hyperlipidemia; hypokalemia
Cyclosporine	Hyperglycemia, hyperkalemia, HTN, hyperlipidemia; hypomagnesemia
Mycophenolate mofetil	Diarrhea, nausea/vomiting, bloating, abdominal cramping
Corticosteroids (prednisolone, solumedrol)	Hyperglycemia, hyperlipidemia, Na retention, increased appetite and weight; decreased Ca absorption
Valgancyclovir	Hyperglycemia, increased appetite; hyper/hypokalemia, hypomagnesemia/Ca/Phos

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Long Term Management

- **Goals:**
  - Achieve or maintain desirable weight
  - Maintain acceptable blood glucose levels
  - Maintain cholesterol levels ≤ 200mg/dl
  - Maintain normal blood pressure
  - Maintain optimal bone density
  - Minimize side effects of medications
  - Maintain healthy lifestyle

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Long Term Management - Nutrient Needs

- Check 25 hydroxyvitamin D levels every 6 months

Table 22. Recommended Supplementation for Vitamin D Deficiency/Insufficiency in Children with CKD

Serum 25(OH)D (ng/mL)	Definition	Ergocalciferol (Vitamin D_2) or Cholecalciferol (Vitamin D_3) Dosing	Duration (mo)
<5	Severe vitamin D deficiency	8,000 IU/d orally or enterally × 4 wk or (50,000 IU/wk × 4 wk); then 4,000 IU/d or (50,000 IU twice per mo for 2 mo) × 2 mo	3
5-15	Mild vitamin D deficiency	4,000 IU/d orally or enterally × 12 wk or (50,000 IU every other wk, for 12 wk)	3
16-30	Vitamin D insufficiency	2,000 IU daily or (50,000 IU every 4 wk)	3

Note: Conversion factor for Serum 25(OH)D: ng/mL × 2.496 = nmol/L.
Adapted with permission.[121]

Table 25. Age-Specific Normal Ranges of Blood Ionized Calcium, Total Calcium and Phosphorus

Age	Ionized Calcium (mmol/L)	Calcium (mg/dL)	Phosphorus (mg/dL)
0-5 mo	1.22-1.40	8.7-11.3	5.2-8.4
6-12 mo	1.20-1.40	8.7-11.0	5.0-7.8
1-5 y	1.22-1.32	9.4-10.8	4.5-6.5
6-12 y	1.15-1.32	9.4-10.3	3.6-5.8
13-20 y	1.12-1.30	8.8-10.2	2.3-4.5

Adapted with permission[121]; Specker,[624]
Conversion factor for calcium and ionized calcium: mg/dL × 0.25 = mmol/L.
Conversion factor for phosphorus: mg/dL × 0.323 = mmol/L.

KDOQI Nutrition in Children with CKD: 2008 Update (Guideline 7)
https://www.kidney.org/sites/default/files/docs/cpgpednutr2008.pdf

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Long-term Complications and Therapy

- **Obesity/Weight gain**
  - **Medical Nutrition Therapy: Healthy eating choices**
  - **Recommendations:**
    1. Mindful eating (hunger cues, slowed eating, portion control, avoiding sweets and sugar-sweetened beverages)
    2. Exercise regimen of appropriate frequency, duration, and variety
    3. Maintenance of normal BMI %ile for age and Z-score
    4. Educate on side effects of medications (prednisolone)
    5. Encourage family members to avoid purchasing processed foods, soda and other sugar-sweetened beverages
    6. Limit screen time

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Long-term Complications and Therapy

- **Hypertension**
  - **Medical Nutrition Therapy: Sodium-restricted diet**
  - **Recommendations:**
    1. Reduce dietary sodium to < 1500 mg/day * (< 2300 mg/day **)
    2. DASH*** diet (less red meat/sodium/sugars, more whole grains/fruit/veggies)
    3. Appropriate weight
    4. Adequate exercise
    5. Behavior modifications

*American Heart Association 2012
**Dietary Guidelines 2015-2020
*** Dietary Approaches to Stop Hypertension

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Long-term complications and therapy

- **Hyperglycemia (elevated HgbA1C)**
  - **Recommendations:**
    1. Diet education (avoiding concentrated sweets and sugar-sweetened beverages)
    2. Appropriate weight
    3. Appropriate hypoglycemic medications
    4. Adequate exercise
    5. Monitor glucose levels
    6. Reduce corticosteroid doses as able (at Cedars we do a steroid avoidance protocol in patients that have low immunologic risk for rejection)

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Long-term complications and therapy

- **Hyperlipidemia**
  - **Recommendations:**
    1. Heart healthy diet: whole grains, variety of fruits & vegetables, healthy fat from fish & plant sources
    2. Limit sugar, saturated fat & trans fats; <10% of calories as saturated fat
    3. Achieve & maintain a healthy body weight
    4. Adequate physical activity
    5. Monitor lipid levels
    6. Lipid-lowering drugs as needed
    7. Adjust immunosuppression drugs if able
    8. Recommend increased intake of omega 3 rich fish (or quality controlled fish oil supplements – UPS Verified Mark)

AHA 2000

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Possible Long-term Complications and Therapy

- **Hyperkalemia**
  - Some patients develop elevated levels of serum potassium as a side effect from taking tacrolimus or cyclosporine
  - It is important to correct this imbalance in order to avoid heart irregularities
  - Potassium is found primarily in milk, dairy products, nuts, beans, fruits, and vegetables, and also meats (list of low, medium, and high K foods/beverages can be given)

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Additional Dietary Guidelines

- **Increase intake of fish which contain large amounts of Omega-3 fatty acids** - May help reduce the toxic effects of Prograf and cyclosporine on the kidney and may help improve blood viscosity?
  - Supplementation provides slight improvement in HDL chol & diastolic BP; too modest to recommend routine use but no harmful effects (Cochrane Database Review 2016)
  - Supplementation showed no benefit on graft survival or reduction in early or late acute rejections (Tufts-NEMC Evidence-based Practice Center 2005)
  - One controlled trial: supplementation favorably influenced renal function in recovery phase after a rejection episode (Tufts-NEMC Evidence-based Practice Center 2005)

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Additional Dietary Guidelines

- **Food Safety**
  - Patients on immunosuppressive medications are at higher risk of infections related to foods which are improperly prepared or stored
  - Advised to always wash your hands before eating or preparing food
  - Advised to make sure meat, poultry, fish and eggs are well cooked before eating
  - Advised to thoroughly clean all fruits and vegetables with a scrub brush even when the outer covering will not be used
  - Based on an FDA warning, it is advised that people with transplants avoid eating commercially grown raw sprouts, which are particularly susceptible to carrying harmful bacteria

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Additional Dietary Guidelines

- **Avoid Grapefruit, Pomelo, Pomegranate, Seville Oranges, Starfruit, and their juices** while taking cyclosporine, sirolimus, tacrolimus or certain statins & antihypertensive medications (Tangelos = tangerine + grapefruit are allowed)
- **Avoid Herbal teas** including peppermint, dandelion, camomile, green, ginger, and turmeric teas due to interactions with tacrolimus (black and white tea are allowed)
- **Avoid Herbal supplements** including Vitamin C, St. John's Wort, Echinacea, Ginseng, and Feverfew due to interactions with transplant medications

Moore LW. Food, food components, and botanicals affecting drug metabolism in transplantation, J Ren Nutr. 2013 May; 23(3):e71-3.

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Case Study 1

- 17 yo male with CKD 3 in transplanted kidney
- Past Medical History: ex-32 weeker, acute renal insufficiency secondary to in- utero ACEi exposure, ESRD s/p DDRT kidney transplant in 2005, on chronic immunosuppression, chronic lung disease, asthma, developmental delay NOS, hearing loss, short stature, OSA, eczema, osteopenia, HTN, optic nerve hypoplasia, eustachian tube dysfunction, G-tube dependence
- Social History: mom didn't know she was pregnant and was on anti-hypertensive medications
- Height- 134.7 cm (4'5") < 1st %ile, Z score = -4.95
- Current Weight- 32.4 kg (71.5 lb) < 1st %ile, Z score = -5.59
- BMI 17- 8th %ile for age, Z score = -1.43 SD

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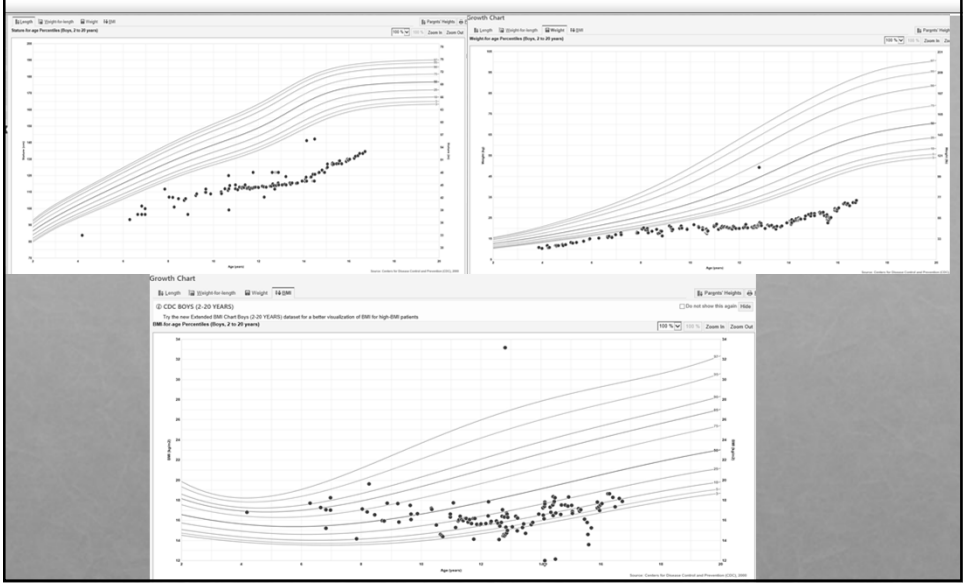
Case Study 1



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Case Study 1

- **Labs include:** Glu 96, Na 141, BUN 29, Cr 2.0, K 3.6, Phos 5.6 H, Mg 2.2, 25 OH Vit D 58.2, HgbA1C 6.1 H
- **Medications include:** mycophenolate, prednisolone, tacrolimus, growth hormone
- **Supplements include:** Renal supplement 3 cans per day, liquid MVI, and cholecalciferol 400 IU per day

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Case Study 1

- Has been re-evaluated for another kidney transplant and is listed as inactive (too well currently)
- The patient demonstrates good understanding and compliance of a renal diet per diet recall. He and mom report he's taking his renal supplements 3 times daily orally, eats a regular diet, but mom admits that > 50% of intake is with liquified foods via G-tube 5-6 times per day
- From a nutritional perspective, the patient is an acceptable candidate for kidney transplant but would benefit from increased PO intake and weight gain to increase BMI for age Z-score to within -1 to +1 SD

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Case Study 1

- **Interventions:**
  - Consider decreasing renal low protein formula to 2 cans/day and liquified foods via G-tube
  - Encourage increased oral intake of low Phos foods (Goal is to increase PO intake and decrease the use of the Mickey button until next May when he graduates from high school and then remove it)
  - Continue cholecalciferol @ 400 IU/day and dc MVI
  - Continue encouraging solids before offering purees via Mickey button, adding oil, butter, avocado (no issues with serum K levels)
  - Consider starting a Phosphate binder with meals/formula supplement since restricting diet too much is not desired

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Case Study 2

- 3 year old male s/p LRKT from mom on 1/15/19
- Past Medical History: PUV, CRF, recurrent UTIs, short stature, ESRD received kidney transplant pre-emptively
- Height
  - On 2/11/19: 92.3 cm (3') 1st %ile, Z score = -2.21
  - On 7/08/19: 97 cm (3'2") 5th %ile, Z score = -1.67
- Weight
  - On 2/11/19: 14.3 kg (31.5 lb) 16th %ile, Z score = -1.00
  - On 7/08/19: 15.2 kg (33.5 lb) 19th %ile, Z score = -0.87
- BMI
  - On 2/11/19: 16.8 81st %ile, Z score = 0.89
  - On 7/08/19: 16.2 70th %ile, Z score = -1.43

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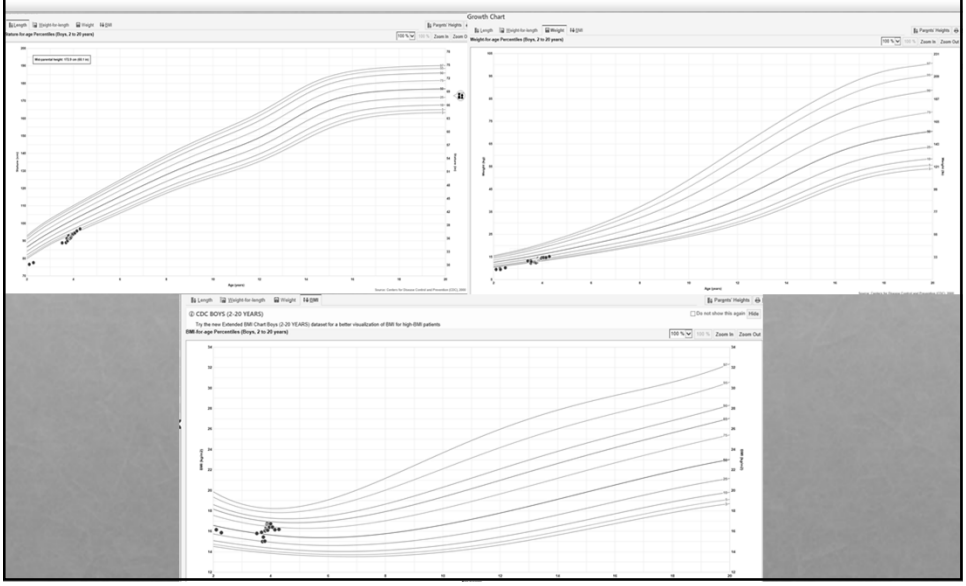
Case Study 2



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Case Study 2

- **Diet and nutrition support order:**
  - Prior to transplant in 2018, was on 20 oz/day of renal powder formula + low K, low Phos solids
  - On 2/11/19: NAS, high phos, protein for healing + 500 mL Pediatric Formula 1.2 via G-tube nocturnally
  - On 7/08/19: NAS, DRI for protein, age-appropriate diet (G-tube feeds discontinued in March, but still uses G-tube to meet 50% of fluid requirements and for medications)
- **Labs include:**
  - Pre-transplant - (7/19/18) Na 139, K 4.8, BUN 75 H, Cr 2.4 H, Ca 10.8, Phos 5.1(nl range for age 4.5-6.5 for 1-5 yo), Mag 3.1 H
  - Post-transplant - (7/2/19) Na 139, K 4.6, BUN 17, Cr 0.45, Ca 9.6 (4/15/19) Phos 4.3, Mag 1.9, Vitamin D 25OH 50.6, HgbA1c 5.0
- **Medications include:**
  - Pre-transplant - FeSO4, gummy MVI, oxybutynin, sodium citrate, growth hormone, salt solution
  - Post-transplant - mycophenolate, oxybutynin, prednisolone, sulfamethoxazole, tacrolimus, valganciclovir

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Case Study 2

- Was evaluated for kidney transplant in September 2017 and then received a planned LRKT in January 2019
- In the transplant evaluation assessment by the RD, “the patient is a good candidate for kidney transplant from a nutritional perspective”
- **Interventions:**
  - Continue NAS age-appropriate diet, working on taking all fluids and medications orally with a goal of removing the G-tube

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Case Study 3

- 17 yo male s/p DDRT 12/28/2013
- Past Medical History: ESRD of unknown etiology with abnormal glomerular and tubular basement membranes on biopsy, maintained on PD for 2 years, chronic active antibody mediated rejection, arterial nephrosclerosis, Obesity and HTN dx'd 7/2014
- Type 2 DM dx'd 11/2018
- Social History: Dad states he's diabetic and there's a strong family history on both sides of diabetes

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Case Study 3

- Height
  - On 12/28/13: 147 cm (58") 52nd %ile, Z score = 0.05
  - On 07/01/19: 178 cm (70") 64th %ile, Z score = 0.37
- Weight
  - On 12/28/13: 39.1 kg (86.2 lb) 53rd %ile, Z score = 0.08
  - On 07/01/19: 117.1 kg (258.2 lb) 19th %ile, Z score = 2.71
- BMI
  - On 12/28/13: 18.6 66th %ile, Z score = 0.42
  - On 07/01/19: 36.9 99th %ile, Z score = 2.54

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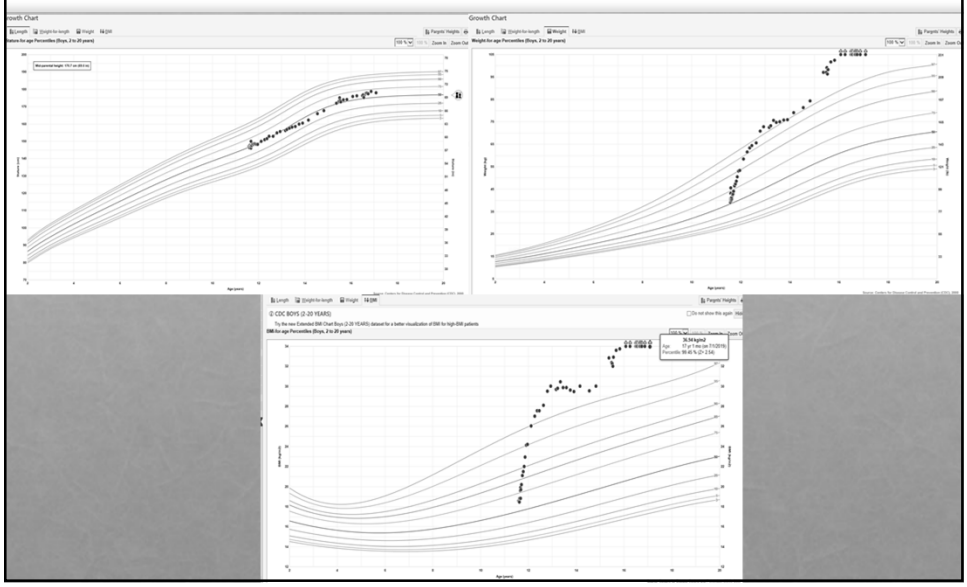
Case Study 3



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Case Study 3

- **Diet order:**
  - Pre-transplant – DRI for protein x 1.3 (on PD), low sodium, low phosphorus
  - Post-transplant (currently) - NAS, No concentrated sweets
- **Labs include:**
  - Pre-transplant - (12/28/13) Na 142, K 3.7, BUN 47 H, Cr 8.8 H, Ca 9.7, Phos 7.9 H
  - Post-transplant – (10/9/14) HgbA1C 5.1 (11/26/18) HgbA1C 6.5 (04/01/19) HgbA1C 6.3 (07/01/19) Na 139, K 3.9, BUN 13, Cr 1.0, Ca 9.5, Phos 3.9, Vitamin D 25OH 25.2 L
- **Medications include:**
  - Pre-transplant - docusate, sodium bicarb, epoetin monthly, amlodipine, calcitriol, sevelamer 3 with meals, renal MVI, vitamin D 5000 units/week
  - Post-transplant – amlodipine, mycophenolate, prednisone, tacrolimus, vitamin D 2,000 units/day, metformin XR 500 mg 4 tabs per day

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Case Study 3

- Was evaluated for kidney transplant at CSMC in February 2013 and then received a planned DDKT in December 2013
- In the transplant evaluation assessment by the RD, "the patient is a good candidate for kidney transplant from a nutritional perspective"
- **Interventions/Recommendations to patient at the most recent visit (7/01/19):**
  - Avoid pepperoni. Continue healthy fats as a snack such as unsalted roasted peanuts/pumpkin seeds
  - Decrease pizza to 1-2 slices at a time and eat less frequently
  - Limit sweets to a small serving no more than once per week
  - Eat more vegetables (carrots and cucumber). Have a fruit after dinner instead of cereal or skip snack at night
  - Walk around campus while in summer school during the break

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Summary

- The pediatric RD is an important part of the transplant team for the nutritional management of the pre- and post- kidney transplant pediatric patient
- It's important to understand the short and long term complications for post-kidney transplant pediatric recipients in order to provide optimal nutrition intervention and guidance

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References

- ADA Evidence-Based Nutrition Practice Guidelines. *Chronic Kidney Disease.* July 2010.
- AND Nutrition Care Manual 2014. http://www.nutritioncaremanual.org/welcome
- Bonis P.A., et. Al. *Effects of Omega-3 Fatty Acids on Organ Transplantation.* Feb 2005. https://archive.ahrq.gov/clinic/epcsums/o3orgsum.pdf
- Cresci, G. *Nutrition Support for the Critically Ill Patient. A Guide to Practice.* Taylor & Francis Group. 2005.
- CSMC Comprehensive Transplant Center- Policies & Procedures Manual
- Hasse, J.M., Blue & L.S. *Comprehensive Guide to Transplant Nutrition.* American Dietetic Association. 2002.
- Kasiske, BL, et. Al. *The Evaluation of Renal Transplant Candidates: Clinical Practice Guidelines.* Am J Trans. 2001; Suppl. 1: Vol 2: 58-59.

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References

- Moore LW. Food, food components, and botanicals affecting drug metabolism in transplantation, J Ren Nutr. 2013 May; 23(3):e71-3.
- Lim AKH, et. Al. *Fish oil for kidney transplant recipients.* Cochrane Database of Systematic Reviews. 2016, Issue 8. http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD005282.pub3/pdf/abstract
- Muzaale, A.D., et. Al. *Risk of End-Stage Renal Disease Following Kidney Donation*. JAMA. 2014; Feb 12; 311 (6): 576-586. http://www.kidneyregistry.org/pages/p359/HHHS.php
- Widmer, Wibur. *One Tangerine/Grapefruit Hybrid (Tangelo) Contains Trace Amounts of Furanocoumarins at a Level Too Low To Be Associated with Grapefruit/Drug Interactions.* Journal of Food Science. 2005; Vol 70: C419. https://naldc.nal.usda.gov/download/1759/PDF
- www.kidney.org (The National Kidney Foundation/KDOQI guidelines)
- www.TransplantLiving.org

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