Failure to Thrive: Clinical Pearls

Definition:

- Failure to thrive is a somewhat out-of-date as term as it may carry an unduly negative connotation with patients and families. You can also say poor weight gain, weight faltering, or faltering growth.
- Failure to thrive (FTT) is broadly defined as failure to gain weight appropriately during the first two years of life. One commonly accepted practical definition for FTT is weight less than the 2nd percentile for gestation-corrected age *and* decreased velocity of weight gain that is disproportionate to growth in length. However, a consensus definition for FTT is currently lacking.
- Another definition sometimes used: A rate of weight change that causes a decrease of two or more major percentile lines over time (eg, from 75th to 25th)
- Children who are born small and remain small do not necessarily have FTT: consider children with genetic short stature, constitutional growth delay, prematurity, or intrauterine growth restriction who have appropriate weight-for-length and normal growth velocity.
- For malnutrition, use z-scores for weight-for-length and length-for-age or mid-upper arm circumference (MUAC)
- Approximately 5 to 10 percent of children in primary care settings will present with FTT.

Etiologies

- The majority of cases of FTT seen in primary care practice are secondary to decreased intake in the setting of feeding difficulties or a poor parental approach to feeding—or to adverse psychosocial factors. Given the broad differential diagnosis, a careful history and physical examination is warranted to help identify the specific pathophysiology underlying each case.
- Intake
    - Psychosocial contributing factors to food insecurity and/or neglect include IPV, postpartum depression, poverty, substance abuse, etc
    - Poor knowledge of child's needs may include formula dilution, excessive juice, poor transition to table food, or not giving enough high calorie foods.
    - Breastfeeding: take a careful history here!
    - Mechanical problems (cleft palate, adenoid hypertrophy) vs dysfunction: suck/swallow issue (neuromuscular)
    - Behavioral feeding problem includes altered oromotor sensitivity, conditioned aversion, possibly exacerbated by things like GERD or constipation
- Absorption issue
    - Celiac disease
    - Cystic fibrosis or other exocrine pancreatic insufficiency
    - Inflammatory bowel disease
    - Prolonged bouts of infectious diarrhea
- Metabolic needs
    - Increased metabolic demand: congenital heart disease, liver/renal disease, endocrinopathies, anemia
    - Failure of proper utilization of energy substrates: glycogen storage disease, fatty acid oxidation disorders, organic acidemias, aminoacidopathies, other inborn errors of metabolism

Clinical Evaluation:

- Important components from history:
    - Age the poor weight gain began
    - Pre- and peri-natal history
    - Any medical problems
    - Infections or other illnesses (especially bacterial illnesses)
    - Stool: in particular, frequency, consistency, blood, mucus
    - Family history (including weight and height of family members)
    - Developmental history
    - Difficulty with feeding, such as coughing, choking, color changes or sweating
    - Dietary history and feeding practices, including foods given, in what setting, how given, for how long, whether child self-feeds or is fed
    - Social history, in detail, with an eye toward availability of resources and any possible contributing stressors

- Review of Systems:
    - Diarrhea or constipation
    - Vomiting
    - Urinary frequency
    - Abdominal pain
    - Appetite
    - Any other pain
    - Rashes
    - Fevers
    - Cough or wheezing
    - Snoring

- Physical Exam:
    - Vital signs, as hypotension could point to dehydration as well as adrenal or thyroid insufficiency, hypertension could point toward renal or cardiac disease, and tachypnea or tachycardia could point toward cardiac, pulmonary or metabolic disease as well as infection or dehydration
    - Overall appearance, for example: any dysmorphisms? Is the child well-appearing—or lethargic or irritable? Does the child look cachectic?
    - The skin exam, including turgor, edema, birthmarks, bruising or petechiae, alopecia, rashes, pallor or jaundice, all of which may point toward a syndrome or concerning clinical status
    - The ears and throat, looking for signs of infection as well as tonsillar hypertrophy
    - Any signs of lymphadenopathy. Be sure to check cervical, supraclavicular, axillary and inguinal areas
    - The lungs, listening for crackles or wheezes, looking for signs of lung disease
    - The heart, listening for murmurs, rubs, extra sounds or arrhythmias
    - The abdomen, in particular being sure to assess for any organomegaly or masses, as well as any tenderness, distension, or increase or decrease in bowel sounds
    - The extremities, doing a careful joint exam as well as looking for deformities
    - The neuro exam, looking for delays, hypertonia, hypotonia, clonus, abnormal reflexes, or signs of neuropathy

Labs:

- Initial baseline laboratory evaluation in a child with FTT typically includes a complete blood count, C-reactive protein, and erythrocyte sedimentation rate to screen for anemia, infection, inflammation, and malignancy.
- Obtain a urinalysis and culture to screen for protein or carbohydrate loss (eg, glucosuria in type 1 diabetes mellitus) and indolent renal disease, such as chronic urinary tract infection or renal tubular acidosis
- Further diagnostic testing depends on patient presentation.
    - Consider a comprehensive metabolic panel, amylase, and lipase to evaluate for potential kidney, liver, or pancreatic disease (and albumin can also be a marker of nutritional status)
    - Consider stool studies (including guaiac, leukocytes, routine culture, ova and parasite smears) if GI symptoms
    - Consider chest radiograph to evaluate for cardiac or pulmonary disease
    - If child does not respond to dietary/behavior modification or certain diagnosis suspected: HIV, allergy testing (IgE, RAST, skin tests), celiac testing (tTG-IgA and serum IgA), stool studies for malabsorption (stool-reducing substances for carbs, stool alpha-1-antitrypsin for protein, and stool elastase for fat malabsorption) or stool inflammatory markers, sweat chloride testing, thyroid studies, metabolic testing, EBV/CMV, hepatitis panel, ANA and rheum testing.
    - Next step imaging/diagnostic studies includes: MBS, UGI, scope, abd US, head imaging

Management:

- In general, mild to moderate FTT can be managed by the primary care pediatrician in the outpatient setting. If a medical problem is identified, it should be treated.
- Strategies to increase calories may include:
    - A higher calorie diet, which may require referral to government assistance programs, food pantries, or other resources. A visit with a nutritionist is recommended, and some children may need to be prescribed nutritional supplements.
    - Changes to the feeding schedule and environment, with detailed advice. Some families benefit from behavioral health assistance and feeding specialists .A referral to Early Intervention may also be discussed.
- Children with severe or recalcitrant FTT may need to be hospitalized for feeding (sometimes via nasogastric tube), calorie counts, observation and further diagnostic and psychosocial evaluation.

Prognosis and Sequelae:

- The prognosis for children with FTT depends on the cause—and how quickly and how effectively it is treated. Most children will improve with appropriate management, but may be at risk for long-term health and cognitive problems, especially when there are psychosocial difficulties present.
- The prognosis is improved when there is a team approach, involving medical, psychological, occupational therapy and community supports. Depending on the cause and on the family situation, close and enduring follow up may be necessary
- Research evidence is conflicting regarding adverse neurodevelopmental outcomes from FTT.
- A meaningful number of children have persistent intellectual or behavioral deficits, but it is currently impossible to predict which children will do well and which will have later difficulties.
- Regarding mechanism, it is unclear whether outcomes relate to energy or protein inadequacy alone or whether deficiencies of vitamins, minerals, or other micronutrients might be responsible.

- Some children with FTT may be biologically programmed to be smaller/thinner (possible via insulin resistance), and aggressive nutritional intervention may put these children at risk for development of metabolic syndrome later in life

Sources:

- Motil, Kathleen J et al. “Poor weight gain in children younger than two years in resource-rich countries: Etiology and evaluation.” *UpToDate*, 31 Jan 2019, https://www.uptodate.com/contents/poor-weight-gain-in-children-younger-than-two-years-in-resource-rich-countries-etiology-and-evaluation?search=failure%20to%20thrive&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1
- Jaffe, Arthur C. "Failure to thrive: current clinical concepts." *Pediatrics in Review-Elk Grove* 32.3 (2011): 100.
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