

Annual Labs and Tests



Lara Freet, RD
Stanford University Hospital & Clinics
March 2011

Agenda

- Cystic Fibrosis Foundation (CFF) Guidelines
- Annual tests include:
 - Oral Glucose Tolerance Test (OGTT)
 - Dual Energy X-ray Absortiomerty (DXA)
 - Fat-soluble vitamin labs
- Improving patient outcomes

Cystic Fibrosis Foundation Guidelines

- Recommendations and statements created by a multi-disciplinary board of CF practitioners
 - CFRD Guidelines 2010 developed by CFF in collaboration with ADA and PES
- Labs and procedures ordered annual as part of health maintenance and monitoring
 - Are the tests always done annually?

National Statistics

- Results are entered into PortCF database on an annual basis
- National statistics are published yearly by CFF:
 - Compare our CF center's progress year-to-year
 - Compare CF centers nationally
 - May be used for research and education purposes

Oral Glucose Tolerance Test

What's the big deal?

- CF-related diabetes (CFRD) is often clinically silent
- Concern regarding nutrition and pulmonary consequences:
 - Unintentional weight loss
 - Protein catabolism
 - Decline in lung function
 - Increase in mortality
 - Increased infection risk
 - Increased risk of developing microvascular complications

The test

- OGTT is the **gold standard** for screening
- Must be done fasting
 - No food or drink for 8-12 hrs before test
- At the lab:
 - Fasting blood glucose (BG) is taken
 - Drink ~ 75 grams glucose
 - Check blood glucose trend after 30 mins, 1 hr, and 2 hrs
- Plan ahead → do on day of clinic visit.

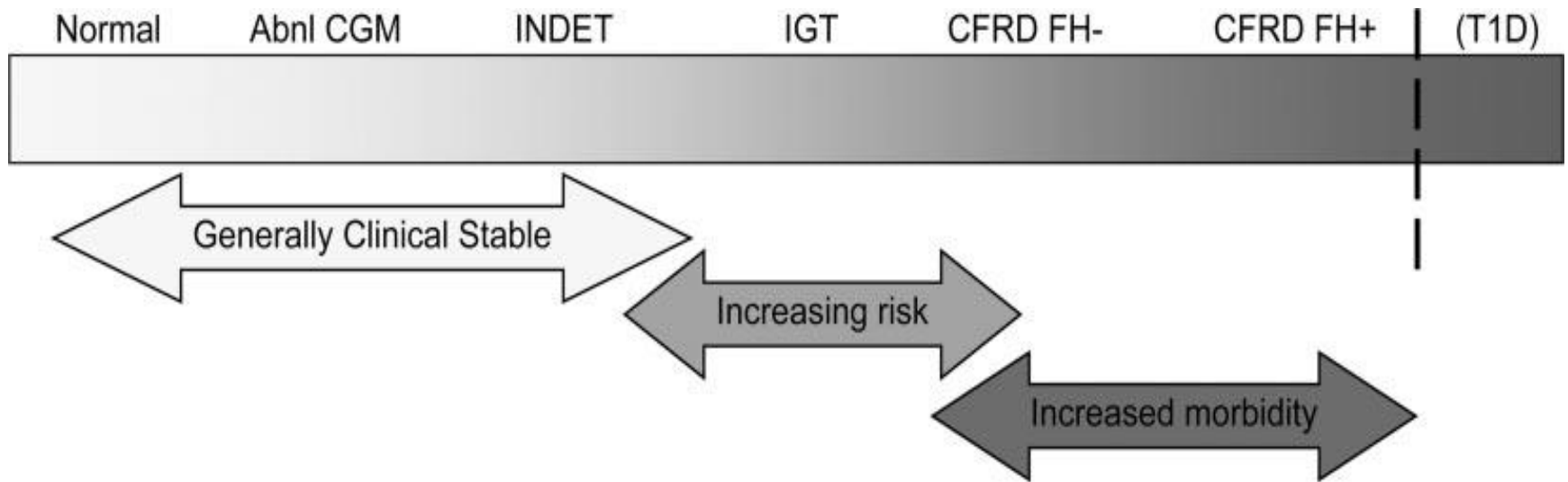
How often do I need to get it done?

- Recommended for all patients ≥ 10 yrs old
- The test must be done annually
 - Unless you meet the criteria for CFRD
- Exocrine pancreatic insufficiency vs. sufficiency
 - Does it matter?
- Pregnancy
 - Routinely performed in 2nd trimester
 - If had Gestational DM, must complete OGTT 6-12 weeks post-partum

Interpreting the results

- The results are interpreted by the CF team
- You can be diagnosed with CFRD if:
 - Fasting BG ≥ 126 mg/dL
 - 2 hr BG ≥ 200 mg/dL
 - A1c $> 6.5\%$ at time of OGTT
 - With 2 hr BG ≥ 200 mg/dL
 - Casual BG ≥ 200 mg/dL + symptoms of polyuria, polydipsia

*It is possible to be diagnosed with CFRD during acute illness, while on steroids, and/or with nutrition support



Interventions

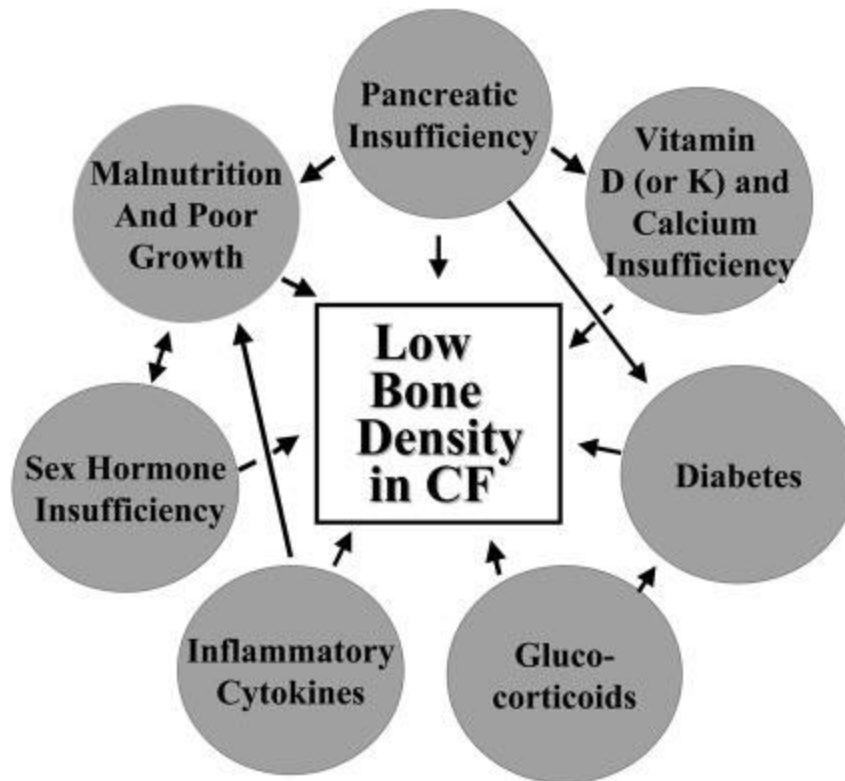
- If the results are normal:
 - Repeat the test annually
- Impaired glucose tolerance [IGT] and Indeterminate glycemia [INDET]
 - May be given a glucometer
 - Increased risk for developing CFRD
- If diagnosed with diabetes:
 - Prescribed a glucometer
 - Check your BS 3-4 x/day or as recommended
 - Referral to an endocrinologist
 - Ongoing education and counseling

Can I prevent diabetes?

- Not really
 - CFRD is not like Type I or Type II DM
 - Insulin deficiency vs. insufficiency vs. resistance
- Role of diet and exercise
 - Need for high calorie, high fat, & protein diet
 - Balanced meals
 - Role of fats and protein
 - Goal: > 150 min moderate aerobic exercise/week

Dual Energy X-ray Absortiometry (DXA)

Bone Disease in Cystic Fibrosis



DXA Procedure

- Performed in the Nuclear Medicine department
- Lay flat on x-ray table
- A scan is completed of hip and spine to check for osteoporosis

How to interpret the results

- Compares your bone density to the bone density of:
 - A healthy young adult (T score)
 - Someone of your same age, gender, and ethnicity (Z score)
 - Looked at more often in adult population
- Results are given in the radiologist's report
 - Interpreted by the CF Attending and CF NP

Interventions

- Normal ↔ Osteopenia ↔ Osteoporosis
- Depending on trend of bone density score:
 - Calcium supplementation
 - Additional vitamin D (and vitamin K) supplement
 - Weight bearing activity
 - Sun exposure
 - Antiresorptive agents prescribed
 - Bisphosphates (Aredia, Fosamax)

Screening (DXA) and Treatment Protocol

Screen all adults and children > 8 years old if <90% Ideal body weight, FEV1 < 50% predicted, glucocorticoids of ≥ 5 mg/day for ≥ 90 days/yr, delayed puberty, or a history of fractures

Baseline DXA

T/Z score[†] ≥ -1.0

$-1.0 > \text{T/Z score}^{\dagger} > -2.0^*$

T/Z score[†] ≤ -2.0

Nutrition

Vitamin D Supplementation
See text (evidence grade III).
Calcium Supplementation
to achieve 1300-1500 mg
(32-37 mmol)/day
(evidence grade II).
Vitamin K Supplementation
0.3-0.5 mg (1.7-2.9
nmol)/day (2 ADEKS)
Target BMI >25th percentile
(both evidence grade II-1).
Encourage, outdoor weight
bearing exercise (evidence
grade I)

Repeat DXA every 5 years

Pulmonary & Endocrine Topics

Aggressive pulmonary
infection treatment (evidence
grade III).
Minimize steroid dosing
(evidence grades I-II).
Treat CF Diabetes, delayed
puberty or hypogonadism
(evidence grades I-II).
Endocrine referral.
If fragility fractures have
occurred, patient is awaiting
transplant or BMD loss is >3-
5%/yr, start bisphosphonate
(evidence grades I-III)

Repeat DXA 2-4 years

Consider Bisphosphonates

Oral

Alendronate 70mg weekly
(or 10mg daily)
(evidence grade I)
Risedronate: 35 mg weekly
(or 5 mg daily)
(evidence grade III)

I.V. †

Pamidronate 30 mg in 500 ml
saline infused over 3 hrs every
3 months (evidence grade I).
Zoledronic acid: 4-5 mg infused
over 15-20 minutes yearly
(evidence grade III).

Annual DXA

Fat Soluble Vitamin Labs

- Need fat in the diet for vitamin absorption in the intestine
- With EPI and malabsorption certain vitamins may not be absorbed well
- Fat soluble vitamins:
 - Vitamin A, D, E, and K

Vitamin A

- Role
 - Vision, bone growth, reproduction, helps regulate the immune system, promotes healthy surface linings
- Lab ordered → serum free retinol level
- Sources
 - Preformed vitamin A – liver, whole milk, eggs, some fortified foods
 - Proformed vitamin A – fruits and vegetables, oatmeal

Vitamin E

- Role
 - Antioxidant, metabolic processes, regulating gene expression, role in immune function,
- Lab ordered → serum alpha-tocopherol level
- Sources
 - Nuts, seeds, nut oils, dark leafy green vegetables

Vitamin D

- Role
 - Help with calcium absorption, bone health, immune function, reduce inflammation,
- Lab ordered → 25-hydroxy vitamin D
- Sources
 - Dairy, fortified juices, some fish, fish liver oils
 - Sunlight
 - Supplements (cholecalciferol or ergocalciferol)

Vitamin K

- Role
 - Blood coagulation, bone metabolism
- Lab monitored → prothrombin time (PT)
- Sources
 - Leafy green vegetables, avocado, kiwi fruits

Interpreting the lab results

- Results are reviewed by CF team
- Check compliance with taking CF-specific MVI
- Dietary Intake
- Sunlight exposure
 - Vitamin D levels
- Additional vitamin supplements
- Closer monitoring of lab trends

Game Plan For Our Center

Improving Patient Outcomes

- All patients are asked to complete labs annually
 - 1st quarter of the year
 - Some tests are not required annually
- Letters mailed to patient
 - If OGTT or DEXA not completed within required time frame
- Lab location
 - Do it at SUH lab for faster results!
 - Must discuss with RN Coordinator about doing labs locally

Questions?