Early Intervention for Metabolic Complications of HIV

A healthy lifestyle and treatment early on may prevent complications down the road

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Today HIV management in the developed world is not just about clobbering the virus. It's about whole health and improved quality of life. Simpler medication regimens and symptom management are not the only priorities. HIV treatment now includes strategies to optimize other health outcomes.

In the general medicine and endocrinology literature we are seeing a surge in a combination of risk factors called "Metabolic Syndrome." The increased incidence of Metabolic Syndrome is identified as a clinical and public health crisis. Table 1 (see below) identifies components of Metabolic Syndrome. Table 2 (see page 35) identifies related conditions and symptoms related to Metabolic Syndrome and Table 3 (see page 35) defines the current basis for diagnosing Metabolic Syndrome.[1,2]

The staggering problems of diabetes and obesity in America underline the importance of doing something about metabolic abnormalities early on. In the general population the rate of diabetes has increased dramatically in the last decade. The projection of new diabetes diagnosis is staggering. Metabolic Syndrome is a precursor to diabetes and bodes our strict attention. According to Centers for Disease Control and Prevention, nearly 21 million Americans are believed to be diabetic, 90 million have insulin resistance, and 41 million more are pre-diabetic with elevated blood sugars that could reach the diabetic level if something is not done to curb faulty food and lifestyle habits. This means over 50% of Americans are impacted by the manifestations of insulin resistance, problems with body composition, pre-diabetes and diabetes. Data shows an increased rate of diabetes in HIV. Also, the DAD study and others have shown that there is a slightly increased rate of heart disease in people living with HIV.[3] Health practitioners are turning to more aggressive and early clinical intervention instead of wait-

Table 1

Hallmark components of metabolic syndrome
• Central obesity (stomach fat)
• Unintentional weight gain
• Difficulty with losing weight and keeping it off
• High blood pressure
• High cholesterol with:
• High LDL (bad cholesterol)
• Low HDL (good choletserol)
• High triglycerides (another form of fat in the blood)
• Type II Diabetes (or impaired glucose tolerance or insulin resistance) (1)
Good to know
• Fatty liver

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ing for the manifestations of obesity, heart disease, and diabetes to complicate heath matters.

In order to preserve heart health as well as offset and prevent complications of obesity and diabetes, there is a very strong argument to intervene sooner rather than later. Studies show that maintaining normal blood sugar levels can prevent almost all the complications of diabetes. The good news is that we have the opportunity to control many of the risk factors for heart disease and diabetes through diet and exercise. The Diabetes Prevention Program (DPP) clearly demonstrates the benefits of healthy lifestyle changes by showing that lifestyle changes reduce diabetes risk by 58%. [4] Also, DPP data show that, pre-diabetes can be reversed with lifestyle changes.[5] The main goals are to treat insulin resistance and pre-diabetes early on to help the body reestablish proper insulin sensitivity and offset progression to glucose intolerance or frank diabetes. Moreover, reducing insulin resistance may reduce the need for multiple medications as other symptoms are often minimized or resolved.

Metabolic syndrome in HIV has a unique set of characteristics.[6] Patients most commonly worry about physical changes. Altered body composition may be more exaggerated in HIV disease. The redistribution of body fat shows up as marked fat accumulation in the stomach and back of the neck and sometimes fat in the buttocks, arms and legs. Other hallmark symptoms include blood sugar changes (high or low fasting blood sugar or fluctuations after meals), pervasive alterations in blood fat levels, high blood pressure, and heart disease, also associated with HIV disease above and beyond what we normally see in HIV-negative people. HIV medications aggravate the condition. Genetic predisposition as well as poor dietary and lifestyle choices may further complicate symptoms.

Despite broader acceptance of metabolic syndrome as a clinical disorder, confusion exists regarding clinical management. There are many studies evaluating the treatment of altered blood fats, sugar, and body composition changes. Treating individual symptoms is done by already proven methods, often by adding additional medications. The syndrome is handled symptom by symptom, not as a whole. Longer-term studies looking at the implications of metabolic problems in HIV are not available yet. However, data from several smaller studies have helped draw associations.[7-9] HIV practitioners rely on treatment recommendations from studies comprised of HIV-negative patients and work under the assumption that these same guidelines should work well in HIV-positive patients. Getting to the root of the cause—insulin resistance—could be a significant advance.

Due to the health consequences of the symptoms, HIV providers commonly treat these conditions separately. Patients may

Table 2

Conditions and symptoms related to metabolic syndrome

- Adult Acne
- Anxiety: agitation, jitteriness and moodiness, with relief once food is eaten
- Carbohydrate cravings/reactive hypoglycemia: fatigue immediately after eating a carbohydrate or sugar-based meal or snack resulting in blood sugar spikes and resulting fall
- Depression
- Skin changes
- Family history of obesity, heart disease, diabetes
- Fatigue/malaise
- Morning or afternoon fatigue, sometimes physical exhaustion all day
- Hisutism (increased facial hair)
- Insomnia/interrupted sleep
- Hair thinning or male pattern baldness
- Mental fogginess
- Inability to focus, poor memory, loss of creativity, and learning disabilities
- Polycystic ovarian syndrome
- Problems with fertility

Table 3

Definition of metabolic syndrome

- Waist circumference (>40 inches, men and >35 inches, women)
- Blood pressure above 130/85 or active treatment for hypertension
- Triglycerides (>150 mg/dL)
- HDL cholesterol (<40 mg/dL for men, <50 mg/dL for women)
- Glucose levels above 100 mg/dL

Good to know

- Glucose levels below 80 mg/dL
- Hemoglobin A1C >6.0 mg/dL or < 5.5
- Abnormal 3 hour glucose tolerance test with response to insulin (*)

Adapted from Adult Treatment Panel III (1)
(*) Glucose and insulin levels at times 0, 1, 2 and 3 hours to track blood sugar clearance in response to a 75-100 g sugar syrup load (20-25 tsps of sugar).

be prescribed medications such as diuretics, ACE inhibitors, lipid-lowering agents, and anti-diabetic medications. However, addressing insulin resistance directly may be more beneficial. The use of metformin (Glucophage or Glucophage XR), a diabetes medication that decreases the liver's production of sugar, increases sugar uptake in fat and muscle cells, and reduces absorption from the GI tract improves (and may be an important co-therapy in) managing metabolic syndrome.[10] Metformin is shown to significantly improve insulin resistance, and impact cardiovascular risk factors and weight.[11-13] Also, alpha glucosidase inhibitors—Acarbose (Precose) and Miglitol (Glyset) inhibit enzymes in the small intestine, slow carbohydrate absorption, and lower insulin resistance.[14] While thiazolidinediones—Pioglitazone (Actos) and Rosiglitazone (Avandia)—lower insulin resistance, they may increase blood fat levels or cause weight gain (as subcutaneous fat—fat under the skin.) Data also support the combined effectiveness of these medications and lifetsyle approaches.[15]

Although lifestyle changes like exercise and and proper nutrition strategies are synergistic and improve results, diet and exercise alone may not be completely effective. The combination of proper nutrition, weight bearing exercise, and metformin may ultimately be most effective.[16] The challenge for patients and practitioners regarding lifestyle intervention is to determine which dietary and exercise approaches are the most effective. Physical activity impacts body composition and makes the body respond better to insulin. Physical activity helps muscle cells use sugar for fuel. Weight bearing exercise in particular improves muscles and cellular insulin sensitivity. By losing stomach fat and being more physically active, the risk of type 2 diabetes is less.

In our practice we take a practical approach to instructing clients about powerful food stratgeies. Data clearly support reducing sugar and refined carbohydrate intake (white bread, white rice, potato, pasta, crackers and most cereals).[17] We emphasize high-fiber carbohydrates that are slow to convert to sugar (low glycemic) (Table 4, page 36 and Table 5, page 37). The glycemic index measures how fast a food is likely to raise your blood sugar and can be a helpful tool for managing sugar and corresponding insulin responses to a meal or eating occasion. The glycemic index indicates the after-meal response your body has to a particular food compared to a standard amount of glucose (simple sugar). Several factors impact sugar rise after a meal or snack: age and activity level, the amount of fiber and fat in the particular food, degree of refinement, meal composition (what else was eaten with the food), how the food is prepared, and how quickly your body digests the food. In general, fiber-rich foods are often the same foods that are thought to be low glycemic foods and seem to have less effect on blood sugars. Individual responses to carbohydrates may vary. Determine your response to food based on the impact on energy appetite and satiety (feeling of fullness) to the various meals and snacks you incorporate.[18]

Complementing meals and snacks with "good fats" and adequate protein is another effective solution to normalizing blood sugar and insulin responses. Studies support the usefulness of adding healthy (essential) fats and oils, especially omega 3 rich and monounstaurated rich fats (flax, oily fish, and olive oil types, respectively).[19-21] These good fats (alongside low sugar and increased exercise) resolve blood fat issues and reduce insulin resistance. In addition, good fats are shown to reduce inflammation and pain.

Table 4

Daily high-fiber strategies

1. High-fiber cereal, fruit and nuts	**14-20 grams**
• 1 oz walnuts	
• ½ cup Multibran or Fiber One	
• ½ cup fresh or frozen berries	
• ½ cup 1% or 2% milk	
2. Legumes	
• ½ cup beans or bean soup	8 grams
• ½ cup lentils or lentil soup	8 grams
4. 2 cups raw vegetables	**5 grams**
5. Low glycemic (low sugar) fruit (apple, pear, orange, berries, peach)	**3-5 grams**
6. 100% whole grain starches	**2-5 grams**
• Brown rice, ½ c	(2)
• Potato with skin, ½ small (2 X 4)	(3)
• Quinoa, ½ c	(5)
• High-fiber bread	(5)
• Rye crackers, high-fiber ½ oz	(3)

Daily net fiber	**29-42 g**
1 serving high-fiber cereal	8-14
2 servings low glycemic fruit	6-10
1 serving legume	8
2 cup vegetables	5
1-2 whole grains	2-5

Also, adequate intake of lean protein is needed to help maintain muscle and energy levels. Table 6 (see page 38) summarizes strategies to achieve better blood sugar control and reduce blood fat levels. Tables 7-9 (see pages 38–39) list protein, good fat and good carbohydrate food choices. Selecting a balance of healthy nutrients at meal and snack times is pivotal in optimizing your metabolism.

Take-home messages

- Glucose is a component of dietary carbohydrates and sugar that the body uses for fuel (energy).
- Insulin helps cells process glucose (blood sugar) and converts it to energy.
- Some carbohydrates are converted to sugar quickly and cause an imbalance with insulin and blood sugar.
- In Insulin Resistance (IR), cells do not respond well to insulin.
- IR leads to obesity and type 2 diabetes.
- Inactivity and excess body weight contribute to IR.
- Moderate physical activity and maintaining proper weight prevents IR.

Table 5

Glycemic index of common foods

Based on 3 oz serving sizes

Slow to convert to sugar	<----------	Fast to convert to sugar
Low glycemic	**Moderate glycemic**	**High glycemic**
Barley (pearl)	Buckwheat (kasha), bulgur (cracked wheat)	White bread, rice bread
Milk, whole & low-fat; yogurt, Blue Bunny (Light 85) (with sucralose) plain or Total Greek 0% fat & 5 g sugar	Milk, skim	Flavored yogurt, kefir and smoothies with added sugar
High-fiber cereal with 8-14 g fiber ½ c, oats, steel cut, high-fiber; oat bran, ½ c prepared	Rye crackers, pumpernickel or rye kernel bread, 100% whole grain	Breakfast cereal bars; most breakfast cereals, including corn flakes, Cheerios, Special K, Total
	Raisin Bran, quick oats, one minute oats	Wheat Farina, oatmeal (rolled oats, instant or regular)
Apricot & apple, fresh & dried; cherries, grapes, grapefruit, pear, peach, plum, & prunes	Mango, kiwi, banana, orange (all raw)	Dates, pineapple, raisins, watermelon
	Juice, natural, unsweetened: apple, orange, grape, grapefruit, tomato juice	Cranberry or pomegranate juice
Beans: black, kidney, lima	Pastas whole wheat & white	White and most wheat breads, white or wheat tortilla, pita bread
Split peas, lentils	Sweet corn, green peas	Bagel, waffle, pancakes, donuts
Chickpeas (garbanzo beans)	Basmati rice, brown rice	White rice, rice pasta, rice cakes
Mung bean noodles	Carrots, sweet potato, yam	Beets, rutabaga, parsnips, potatoes
Peanuts, other nuts	Pinto beans	Couscous, millet
Fructose	Custard	Pretzels, popcorn
Ice cream, premium	Hot chocolate made with cocoa powder and low-fat or full-fat milk	Sorbet
Stevia	Ice cream, nonfat or low-fat, sherbet	Soda pop, sweetened sports drinks
		Hot chocolate, made with chocolate syrup
		Honey, jelly, table sugar

- IR contributes to heart disease by damaging the heart and blood vessels.
- Control blood pressure, total and LDL cholesterol and stop smoking.
- Exercise and proper diets prevent obesity and type 2 diabetes.

Table 6

Insulin sensitizing nutritional suggestions

1. Balance meals and snacks: protein + good fat + slow carb
2. Select a variety of good fats from the following categories on a daily basis
3. Don't skip meals: 4-6 small meals/snacks a day, eating every three hours
4. Blend of good fats daily
5. Improve carbohydrate intake
   - A. Low Glycemic
     - i. High-fiber fruits, high-fiber grains
     - ii. Limit "sweet carbs," high sugar fruit and juices
     - iii. Limit sugar and white, refined starch
6. Limit caffeine, use organic decaffeinated coffee and teas
7. Limit alcohol
8. No soy
9. Use flax/borage oil (*no lignan*) daily in divided doses
10. No flax seed
11. No soda pop
12. Supplements to consider
    - Balanced multivitamin and antioxidant with B complex
      - A. Supports healthy fat metabolism
    - Potential insulin sensitizers
      - A. Chromium picolinate 200 mcg three times a day with food
      - B. N-acetyl cysteine
      - C. Cinnamon ½ tsp
    - Omega 3 rich fat
      - A. Flax and borage oil blend
      - B. EPA/DHA 500 mg/500 mg

Table 7

Low-fat, protein-rich sources

2-3 Servings protein a day

- Hormone-free meat, fish* (especially cold water types), poultry, seafood
- Hormone-free eggs (Phil's, Eggland's Best)
- Whey or rice protein powder meal replacement or smoothies

3-4 Servings calcium containing protein

- Stonyfield Farm plain yogurt
- Total Greek yogurt 0% fat
- Traders Point Berry or citrus (plain yogurt with natural fruit puree)
- European cheeses (European dairy products are hormone-free)
- Organic, hormone-free, 1–2% low-fat milk

For lactose intolerance or cow milk sensitivities or lacto vegetarians

- Almond milk (low sugar)
- Rice milk (low sugar)
- Goat milk
- Sheep or goat milk cheeses or yogurt

Note: Combine plain yogurts with fresh (or frozen) fruit (slices or puree), Stevia (natural sweetener), nuts and flax oil blend, for a balanced, tasty parfait

Tables 8a-d: Select a variety of healthy fats daily 4-6 servings

Table 8a: "Olive oil" rich sources

- Olive or canola oil unrefined, cold pressed, 1 Tbsp
- Canola mayo (spectrum), 1 Tbsp
- Almonds, 1 oz
- Almond butter, 2 Tbsp
- Avocado, ¼
- Olives, 8-10
- Olive tapenade (equivalent up to 15 g fat)
- Hummus with olive oil (equivalent up to 15 g fat)

Table 8b: Omega 3 ALA rich sources

- Flax Oil Blend (*no lignan*)
  - Barlean's Omega Twin
  - Udo's Blend
- Walnuts, 8-10
- Walnut oil, 1 Tbsp
- Canola oil, 1 Tbsp
- Wheat germ (equivalent up to 15 g fat)
- Butternuts (equivalent to 15 g fat)
- Red and black currant oil, 1 Tbsp
- Pumpkin seeds (equivalent up to 15 g fat)

Table 8c: Fish oil or EPA/DHA rich sources 4–6 oz serving size

- Wild salmon, fresh, frozen
- Ahi tuna
- Genova Tonno Tuna (canned, Chicken of the Sea, packed in olive oil)
- Sardines
- Trout
- Cod

Table 8d: Other good fat sources (blend of health promoting fats)

- Nuts, raw (cashews, pistachios, macadamia nuts, pecans), ¼ cup
- Natural nut butter (peanut, cashew, cashew/macadamia), 2 Tbsp
- Butter, or coconut oil, 1 tsp.
- Natural nut bars (Kind and Boomi brands, 3-8 g sugar per serving)

Note: Avoid soy and whey protein bars

Table 9

Good carbs

Select high-fiber and low glycemic carb foods. Always include a protein and good fat source with carbs to blunt blood sugar responses and maximize nutrient utilization.

1-2 servings low glycemic fruit

- Apple, pear, citrus
- Berries: strawberries, raspberries, blueberries, blackberries, ½ to ¾ c
- Bing cherries, ½ c
- Cranberries, dried, unsweetened, 2 Tbsp

Notes: If including "sweeter fruits," adjust portion and don't eat on an empty stomach; 2-4 oz natural juice, mixed with pulp and flax oil blend

Vegetables

- Unlimited non-starchy vegetables
- 4 oz natural vegetable juice mixed with flax oil blend

2-3 servings legumes or barley

- ½ c lentils, beans, chickpeas, split pea, barley

1-2 servings 100% whole grains, ¼ to ½ c

- Amaranth
- Brown, Basmati or wild rice
- Farro
- Quinoa
- Wheat, lentil, polenta or spelt pasta (5 g fiber)
- Whole grain cereals, ½ c
- Fiber One or All Bran, 14 g (low sugar)
- Multi-bran fiber, 8 g fiber (low sugar)

*(Add cinnamon and nuts for flavor and texture)

100% whole grain, high-fiber bread, 1 slice

- Natural Ovens, Dakota Sun, Ekezial Breads or Flat Flush Tortillas 4–5 g per slice/serving

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