DiabetesWatch

A publication of the PHILIPPINE DIABETES ASSOCIATION, INC. for the Filipino diabetic patient

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GO FOR FIBER - IT'S HEALTHY

Do you usually swallow the seeds of the lanzones – whether big or small? When you eat an orange (whether native or imported), do you take in everything – pulp and all? How does serving unpolished rice appeal to you? Have you ever tried substituting oatmeal for the refined bread at the breakfast table? If your answer is yes to these questions, then your diet has a good load of fiber.

Fiber? What is it anyway? It's simply roughage. Fiber forms the skeleton of all plants and includes the protective covering of the cereal grain called the bran. Edible seeds and skins of fruits, plant gums such as guar; and pectic substances such as pectins are considered fiber (crude fiber, to be more precise). Ligaments or gristle in meats are also considered fiber.

Fiber has a lot of good uses although it is indigestible. Precisely because of its indigestibility, it promotes normal bowel movement. Therefore, no laxatives would be necessary if the diet has good fiber content. Moreover, fiber requires more chewing time when ingested. If it requires more chewing, then eating time is slower, thus promoting good eating habits. When fiber reaches the small intestines, it absorbs water, imbibing at the same time sugars and starches, hence slowing down their absorption. Some authors explain that the effect of fiber in the intestine is irritating, causing the unstirred layer of the intestine to increase in thickness thereby slowing absorption rate and also decreasing the amount of nutrient absorbed. A high fiber diet also prevents too much fat and cholesterol absorption since it binds these substances thereby preventing the deposition of these substances in the arteries. Hence, a high fiber diet will benefit not only diabetics, but even non-diabetic, persons, as well.

A possible drawback, however, would be flatulence which high fiber diets may cause. Some people therefore, would not like such a diet simply because these high-fiber foods are gas forming. However, the advantages of the diet simply outweigh its few disadvantages.

Eating orange with its pulp can be fun. A 'camote-tops' salad with fresh tomato slices is a good "partner" for most grilled or broiled meat dishes. A piece of potato baked in jacket not only retains its vitamin C, but is a good source of fiber, too, if eaten with its skin. Mongo with 'malunggay' leaves or 'ampalaya' is not only a relatively low-cost protein food but is an ideal source of fiber, too. The feeling of fullness given by these leafy vegetables, fruits with edible skin and seeds, whole grain cereals and legumes (like mongo, kidney beans, etc) are the "extras" of a measured diet. Hence, why not go for high fiber foods? It's healthier.

(Ma. I.Q.C.)

HOPE FOR THE DIABETIC PATIENT:

Pancreas Transplantation

Diabetologists and other scientists have strived through the years to devise ways of making diabetic patients live a "normal" life. A great challenge remains, and this is to find a cure which will free diabetic patients of injections, pumps and the like. The great strides achieved in the field of organ transplantation, such as kidney transplantation, has stimulated the interest in pancreatic transplantation – for here lies the hope of the diabetic patient! A functional pancreatic graft will make the diabetic person approximate normal individuals, maintaining normal plasma glucose levels, and without the threat of complications of diabetes mellitus, hovering over them.

In the diabetic person, the insulin-producing cells, the islet cells of Langerhans in the pancreas, may have been either destroyed by viruses or other agents or they do not function properly. Hence, one approach to the treatment is to replace the defective islet cells or the entire pancreas. This could be done by transplanting the whole pancreas or just the islet cells isolated from the rest of the pancreatic tissue. Transplanting the whole pancreas has been thought of, even long before insulin was discovered. The possibility of pancreatic transplantation as a means of treating diabetes mellitus was suggested by Ssobolew in 1902, twenty years before Banting and Best discovered insulin. Animal studies were conducted and in 1966, the first transplantation of the whole pancreas in a human diabetic was performed by Kelly and Lillehei. This case showed that the pancreatic graft was able to bring plasma glucose levels to normal and it made possible discontinuing insulin injections. However, technical problems and the ability of the immune system of the body to reject transplanted tissue obtained from other unrelated individuals, as well as, draining the enzyme-rich pancreatic juices, had to be resolved before clinical application could be advocated. Improvements have been made along these aspects. Thus, from 1966 to 1981, 183 pancreatic transplants have been performed in 171 insulin dependent diabetics or so-called Type I diabetic in 28 institutions all over the world. Twenty patients have functioning pancreatic grafts and do not require insulin injections. The most cele-

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The Treatment of Diabetes Mellitus:

THE CHOICE IS YOURS !

(Part II)

Indications for Insulin Therapy. Insulin is indicated in: 1. Type I or Insulin Dependent Diabetes Mellitus patients, who are unable to produce adequate insulin and must be given insulin injections. Missing or reducing the insulin dose, especially on sick days, is a common cause of diabetic ketoacidosis and coma in this type of patients. 2. Patients who are failures to oral antidiabetic agents. They are patients who initially cannot be controlled with maximum dosage of an oral antidiabetic agent in spite of following religiously the prescribed diet and exercise for at least one month (primary failures). Some patients may be initially well controlled by these agents, but become failures later in the course of treatment (secondary failures). 3. Those who suffer from hypersensitivity reactions to oral antidiabetic agents occuring in the form of – a) skin lesions; *i.e.* itching, urticaria, the scaling or shedding off of layers of skin; b) jaundice or yellowish discoloration of the skin; c) blood disease like agranulocystosis (decrease of white blood cell count) or pancytopenia (decrease of all blood elements), 4. Patients with any active infection especially when there is fever and leucocytosis (increase in white cell count). 5. Before, during and after major surgery. 6. Treatment of diabetic acidosis. 7. Patients with kidney and/or liver disease, as almost all of the oral antidiabetic agents are metabolized by the liver and exreted by the kidney. Impairment of function of these organs would prolong the effectivity of the drugs and thus may cause severe and sometimes irreversible hypoglycemia. 8. In pregnant patients, because of the possible ill effect of oral antidiabetic agents on the foetus, but largely because as pregnancy progresses particularly from the 5-6th months, there is an increase of insulin requirement of the mother which may not be adequately met by use of tablets. The life of both mother and foetus would then be at risk especially if diabetic acidosis occurs.

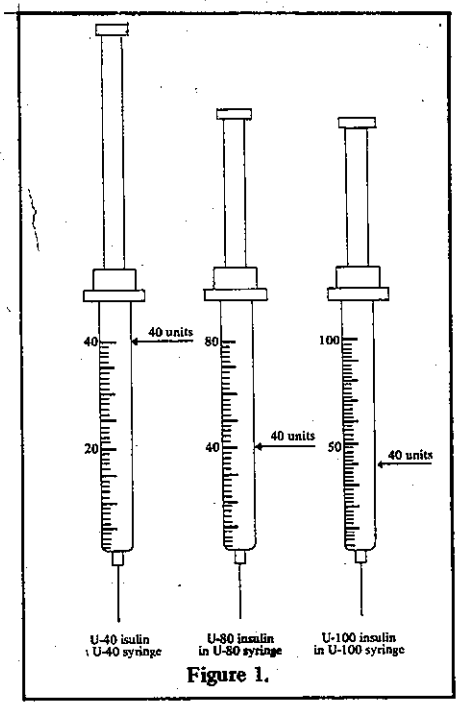

Figure 1.

The insulin preparations most commonly used in the Philippines are: A. Rapid acting, such as Regular or Crystalline, and Actrapid MC. B. Intermediate acting, such as NPH, Monotard MC, Rapitard MC and Lente MC (where MC stands for the monocomponent insulins).

Because of the rapid action of regular or crystalline and actrapid insulins, they are given when there is need for immediate lowering of blood glucose as in diabetic acidosis. However, since their duration of action is limited, they are given at short intervals until the desired effect is achieved. In contrast, NPH and monotard insulins do not take effect immediately but have longer durations of action. They are used singly or in combination with fast acting insulin given once a day or twice a day to produce the desired control of the diabetic state. Monocomponent (MC) insulins are preparations wherein most of the pancreatic impurities have been removed thereby reducing the antigenic properties. The chances of developing allergic reactions from these preparations are greatly reduced especially those from pork pancreas (Actrapid and Monotard insulins). These preparations are, therefore, especially indicated for those who develop hypersensitivity reactions to combined pork and beef insulin and likewise in those who develop insulin resistance requiring increasing amounts of insulin, usually 200 "u" or more/day.

Insulin should be stored in the refrigerator at about 40°F but not in the freezing compartment. The bottle in current use may be kept at room temperature as some patients may find cold insulin unpleasant when injected. If extremes of temperature are avoided, insulin can be kept at room temperature for months without having any significant loss of strength. The expiration date on every bottle of insulin has a large safety margin. Before this date, there is absolutely no question about the potency of the insulin. After the expiration date, the insulin may start losing strength.

Soon all insulin preparations will be U100, and this will avoid errors in doses which occur when there is mismatching of insulin syringe with the insulin preparation. Remember that 40 "U" of insulin in a U 40 solution is equal to 40 "U" in U 80 or U 100 solution, but the amount or volume of solution decreases as a more concentrated preparation is used. Avoid error in dosage by using an insulin syringe which matches the strength of your solution (U 40 syringe for U 40 solution). See Figure 1.

The appearance of hypertrophy (hard swelling) or lipo-atrophy (depression) at the site of insulin injections may be due to local reaction to the type of insulin used. This is commonly

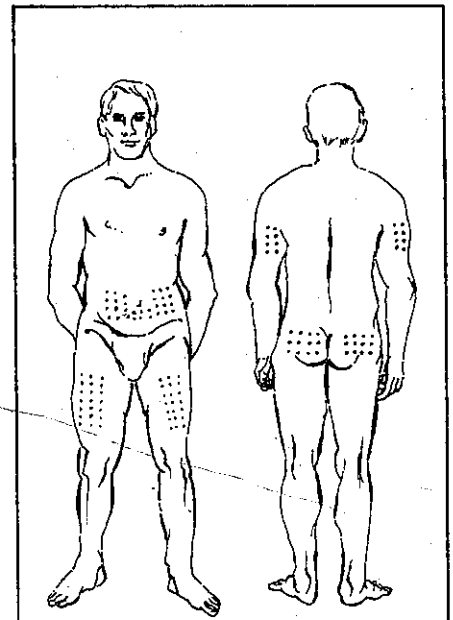
Figure 2. Possible sites for insulin injection. Rotating injection sites helps to prevent the formation of atrophy, scarring, or hypertrophy. By using all the available sites, it may be possible to inject the same area no more than once a month.

caused by combined beef and pork preparations (as Regular and NPH insulins) or repeated injections in the affected parts. The latter may be avoided by having a definite pattern of injection. As illustrated in Figure 2, one region is used at a time. Injections are given at one inch interval, in this way a certain region may be used for 3 or more weeks before going to another part. Filling in of depressed areas have been treated successfully by injection in these areas of purified insulin preparations as the single-peak insulin or monocomponent insulins (Monotard, Rapitard, etc.)

Human Insulin: Genetically altered bacteria were first coaxed into producing human insulin in 1978. Today, this type of human insulin is commercially available in Great Britain and the United States. Another type is made by altering the structure of pork insulin transforming it to human insulin. Although studies have shown human insulin to be both safe and effective, researchers have yet to show that it is superior to the purest animal insulin. Dr. S. Edwin Fineberg, of the Indiana University School of Medicine reported that the human body seems to react to human insulin in the same way as it reacts to purified pork insulin.

Approaches to More Physiologic Insulin Delivery: Recent advances to obtain control of the diabetic state are:

1. *TRANSPLANTATION* of insulin producing tissue: – whole or segmental adult pancreas, fetal pancreas, isolated islets or cultured islet cells have been transplanted. Reports of success with these procedures have been made but to date there are still a lot of technical and immunologic problems to be overcome. This remains still experimental.

2. *ELECTROMECHANICAL DEVICES* have been developed to improve the means of insulin delivery to simulate more closely the normal physiology of insulin delivery.

a. OPEN LOOP OR INSULIN PUMP is worn externally. Insulin is infused continously, at a rate sufficient to match basal metabolic needs. The basal infusion is augmented by an additional bolus of insulin delivered 15 to 30 minutes before each meal. Most pumps deliver insulin subcutaneously through a fine gauge needle or catheter. Other pumps currently under development and testing employ the intraperitoneal or intravenous route. Both the insulin pump and multiple daily injections of insulin are excellent ways to maintain tight control over blood sugar. Deaths occuring in pump users have been reported mostly from hypoglycemia in those who fail to monitor their blood glucose closely. Accidental disconnection of the catheter or needle have led to diabetic acidosis in some patients.

b. CLOSE LOOP DEVICES are capable of monitoring glucose concentrations in the blood. The insulin delivery rate is automatically adjusted based on the monitoring component and blood sugar is immediately regulated. This is called an artificial beta cell or biostator. As of now, these devices are still big in size and not practical for daily use. The miniaturized implantable pump is the subject of research. (A.V.-C.)

Your QUESTIONS / Our ANSWERS

Q. I have numbness in my lower legs, and I am much bothered by it. A friend suggests that I soak my feet in hot water. I have diabetes of more than 10 years duration for which my physician is giving me pills. I am 67 years old.

A: You should not soak your feet in hot water. The fact that your legs are numb may mean that you have nerve damage, which dulls the feeling in your feet. You may burn your feet without your knowing it! This could lead to a non-healing wound of your feet, which in the extreme condition, may mean amputation of your legs. Good control of your blood sugar and some recommended leg exercises may help to lessen the numbness of your feet. (ADL)

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PHILIPPINE
DIABETES
ASSOCIATION, INC.
with offices at Room SA 301,
Lung Center of the Philippines
Ellpitical Road, Quezon City

President:
Dr. Augusto D. Litonjua

Vice President:
Prof. Efren Hernandez

Secretary-Treasurer:
Dr. Celia S. Talusan

Board of Directors –
Dr. Augusto D. Litonjua
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Dr. Ricardo E. Fernando
Dr. Dominador Garduno, Jr.
Dr. Gregorio Moral
Dr. Flora M. Pascasio
Dr. Celia Samson-Talusan
members

Contributors to this issue:
Ma. Imelda O. Cardino, R.N.D., M.S.F.N.
Augusto D. Litonjua, M.D.
Flora M. Pascasio, M.D.
Aurora Villegas-Cinco, M.D.

Hope for. . .

(Continued from page 1)

brated success is the pancreatic transplant done by Gliedman and his colleagues in which the patient has been off insulin for four years.

The metabolic studies following functional pancreas grafts showed that normal carbohydrate metabolism is restored. Plasma glucose level is maintained within the normal range. Insulin is detectable and it is released promptly in response to meals. Near normal glucose tolerance test and metabolic profiles are achieved. Insulin antibodies disappeared one month after transplantation.

Pancreas transplantation has proven to be effective in correcting the elevated plasma glucose levels and the major metabolic abnormalities. Aside from transplanting the entire pancreas, segmental pancreas transplantation has been performed. Segmental transplantation refers to transplanting only the body and tail of the pancreas which contain the bulk of the insulin producing cells. This has also been shown to be effective in curing diabetes mellitus. Unavailability of donors, graft rejection, and technical problems for whole and segmental pancreas transplantation compelled scientists to find a better approach, hence, islet cell transplantation was conceived. With present techniques, one can completely separate the islet cells from the rest of the pancreas. Animal experiments have been done and the results have been summarized by Lacy. Among the encouraging results is that "diabetes and the early microvascular complications are reversed by islet transplantation." This approach has been tried in humans. The major problem is the source of islet cells because there is an extremely low yield from the normal human pancreas. The best site for islet cell transplants remains to be specified.

There are indeed some problems still to be resolved in the field of pancreas and islet cell transplantation. However, these can be overcome in due time. It will not be long before this therapeutic approach will find a wide clinical application. (F.M.P.)