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Jurnal Medika Planta, mulai terbit tahun 2010, merupakan jurnal yang berisi artikel mengenai tanaman obat dan obat-obatan yang berasal dari tanaman. Jurnal ini menyajikan hasil penelitian, tinjauan pustaka, dan laporan kasus dalam bidang tanaman obat yang meliputi ilmu pertanian, farmasi, dan ilmu-ilmu dasar kedokteran, serta ilmu terapan / klinik. Jurnal ini terbit setahun dua kali, yaitu pada bulan April dan Oktober..

PRAKATA

Segala puji dan syukur kami panjatkan kepada Tuhan Yang Maha Esa atas petunjuknya sehingga JMP (Jurnal Medika Planta) edisi bulan April 2011 dapat hadir dihadapan kita.

Informasi ilmiah berupa artikel yang terkait dengan pengembangan obat bahan alam, mencakup hasil penelitian meliputi ilmu pertanian, farmasi, kimia dan ilmu-ilmu dasar kedokteran , ilmu terapan / klinik serta pemikiran yang berkaitan dengan program peningkatan kesehatan bagi masyarakat Indonesia khususnya yang berkaitan dengan herbal medik sangatlah diperlukan.

JMP (Jurnal Medika Planta) ini diterbitkan secara berkala dua kali dalam satu tahun oleh (PDHMI) Perhimpunan Dokter Herbal Medik Indonesia didukung antara lain oleh Universitas Kristen Maranatha. Terbitan kali ini merupakan terbitan ketiga dan bertujuan untuk memberikan informasi pengembangan herbal medic bagi para dokter dan tenaga profesi yang berhubungan dengan kesehatan serta pihak yang terkait.

Penerbit berharap jurnal ini akan memberikan manfaat bagi para pembaca dan menjadi sarana komunikasi tenaga kesehatan yang berminat di bidang herbal. Untuk kontinuitas penerbitan jurnal ini diharapkan partisipasi ilmuwan, herbalis dan pemerhati herbal lainnya dapat menyumbangkan artikel penelitian atau tinjauan pustaka yang terkait dengan obat herbal.

Selamat membaca

Penyunting

COMPLEMENTARY THERAPY OF DIABETES MELLITUS

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ABSTRACT

Diabetes mellitus (DM) is historically characterized by hyperglycemia. The pathophysiologic processes causing hyperglycemia include insulin deficiency, impaired glucose disposal (insulin resistance), and increased hepatic glucose production. Type 1 diabetes mellitus (T1DM) results from an insulin deficiency state usually caused by immunologic damage to beta cells. Some patients with T1DM also have features of insulin resistance. Type 2 diabetes mellitus (T2DM) results from insulin resistance, often associated with central obesity, increased hepatic glucose production, and a progressive decline in beta cell function that is not immunologically mediated.

Diabetes in Traditional Chinese Medicine is divided into five stages, representing a progression from simple yin deficiency to complete break down of the body systems, that can be evaluated by looking the patient tongue. There are the base formula of 8-12 herbs was presented to treat Diabetes Mellitus as complementary treatment. These formula use herbs such as Pueraria lobata root, Rehmannia glutinosa root, Trichosanthes kirilowii root, Scrophularia ningpoensis root, Salvia miltiorrhiza root, Polygonatum sibiricum root, Polygonum multiflorum root, and ophiopogon.

Keyword: *Diabetes mellitus, Traditional Chinese Medicine.*

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TERAPI KOMPLEMENTER UNTUK DIABETES MELLITUS

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ABSTRAK

Diabetes mellitus (DM) ditandai dengan hiperglikemia. Proses patofisiologi yang menyebabkan hiperglikemia meliputi defisiensi insulin, resistensi insulin, dan produksi glukoneogenesis hepatik yang meningkat. Diabetes mellitus tipe 1 adalah suatu keadaan defisiensi insulin yang biasanya disebabkan oleh kerusakan sel beta pankreas. Beberapa pasien dengan DM tipe 1 juga memiliki resistensi insulin. Diabetes mellitus tipe 2 adalah suatu keadaan yang berhibungan dengan resistensi insulin, dan sering dikaitkan dengan obesitas sentral, peningkatan glukoneogenasis hepatik, dan penurunan progresif fungsi sel beta.

Diabetes dalam *Traditional Chinese Medicine* dibagi menjadi lima tahap, yang dapat dievaluasi dengan melihat lidah pasien. Pengobatan DM dapat menggunakan formula herbal tertentu terdiri dari 8-12 herbal sebagai pengobatan komplementer. Herbal tersebut antara lain akar *Pueraria lobata*, akar *Rehmannia glutinosa*, akar *Trichosanthes kirilowii*, akar *Scrophularia ningpoensis*, akar *Salvia miltiorrhiza*, akar *Polygonatum sibiricum*, akar *Polygonum multiflorum*, dan *ophiopogon*.

Kata kunci: Diabetes Melitus, *Traditional Chinese Medicine*

INTRODUCTION

Diabetes mellitus (DM) is historically characterized by hyperglycemia. The pathophysiologic processes causing hyperglycemia include insulin deficiency, impaired glucose disposal (insulin resistance), and increased hepatic glucose production. Type 1 diabetes mellitus (T1DM) results from an insulin deficiency state usually caused by immunologic damage to beta cells. Some patients with T1DM also have features of insulin resistance. Type 2 diabetes mellitus (T2DM) results from insulin resistance, often associated with central obesity, increased hepatic glucose production, and a progressive decline in beta cell function that is not immunologically mediated.

The processes by which hyperglycemia contributes to the complications of diabetes are not yet established. However, the following are considerations. Hyperglycemia is associated with the glycation of many proteins, including structural proteins. This can result in advanced glycation end products (AGEs), modified protein products that have been associated with many of the complications of diabetes. Glycation of low-density lipoprotein (LDL) makes it more susceptible to oxidation. Lipid oxidation is one of the proposed mechanisms for atherosclerosis. Hyperglycemia increases sorbitol accumulation in tissues and has been invoked as a mechanism for neuropathy and retinopathy. Hyperglycemia increases the concentration of protein kinase C β (PKC β) in the retina, which in turn is associated with increased concentrations of vascular endothelial cell growth factor (VEGF). VEGF contributes to the increased risk for proliferative changes in the eye and to loss of endothelial cell integrity and associated risk for macular edema.

DIAGNOSTIC CRITERIA

The diagnosis of diabetes is based on several findings. The following criteria have been established by the American Diabetes Association (ADA) [1]:

- Fasting glucose level higher than 126 mg/dL on two occasions. This fasting glucose value is consistently associated with the risk for retinopathy. This cut point value will miss a number of

patients who have diabetes based on oral glucose tolerance testing results. Observational data suggest that this threshold fasting glucose for diagnosing diabetes may be too high, because patients with impaired glucose tolerance develop retinopathy.

- Random or casual glucose higher than 200 mg/dL, with symptoms of DM. This is a common way to diagnose DM. Many patients do not have obvious symptoms, but that should not alter the fact that a random blood glucose level in this range generally establishes the diagnosis of DM. This criterion is not affected by the time of the last meal.
- Oral glucose tolerance test (OGTT) result after a 75-g oral glucose load, 2-hour value higher than 200 mg/dL. The oral glucose tolerance test is not generally recommended in clinical practice. Such testing requires 3 days of high carbohydrate intake, and tests are not always reproducible.

Hemoglobin A_{1c} (HbA_{1c}) values are too insensitive to be used as a screening test for DM. Elevated values (e.g., higher than 6.2%) are usually associated with a diagnosis of DM, but patients can have DM with values below this range. Thus, elevated HbA_{1c} values are a specific test for the diagnosis of DM, but they are not highly sensitive.

DRUG TREATMENT DEPENDS ON THE TYPE OF DIABETES:

Type 1 diabetes (also known as Insulin Dependent Diabetes Mellitus (IDDM)) is where the body does not produce insulin, so replacement insulin must be delivered by injection or pump.

Type 2 diabetes (or Non Insulin Dependent Diabetes Mellitus (NIDDM)) patients may be able to control their blood glucose levels by carefully following a diet and exercise program and losing excess weight. If this first-line treatment does not control blood sugar levels effectively, an oral medication can be added to the treatment plan. In certain circumstances, patients with Type 2 diabetes may also need insulin injections. A number of drug options exist for treating type 2 diabetes, including:

Sulfonylurea drugs. These medications stimulate your pancreas to produce and release more insulin. For them to be effective, your pancreas must produce some insulin on its own. Second-generation sulfonylureas such as glipizide, glyburide and glimepiride (Amaryl) are prescribed most often. The most common side effect of sulfonylureas is low blood sugar, especially during the first four months of therapy. You're at much greater risk of low blood sugar if you have impaired liver or kidney function.

Meglitinides. These medications, such as repaglinide, have effects similar to sulfonylureas, but you're not as likely to develop low blood sugar. Meglitinides work quickly, and the results fade rapidly.

Biguanides. Metformin (Glucophage) is the only drug in this class available in the United States. It works by inhibiting the production and release of glucose from your liver, which means you need less insulin to transport blood sugar into your cells. One advantage of metformin is that is tends to cause less weight gain than do other diabetes medications. Possible side effects include a metallic taste in your mouth, loss of appetite, nausea or vomiting, abdominal bloating, or pain, gas and diarrhea. These effects usually decrease over time and are less likely to occur if you take the medication with food. A rare but serious side effect is lactic acidosis, which results when lactic acid builds up in your body. Symptoms include tiredness, weakness, muscle aches, dizziness and drowsiness. Lactic acidosis is especially likely to occur if you mix this medication with alcohol or have impaired kidney function.

Alpha-glucosidase inhibitors. These drugs block the action of enzymes in your digestive tract that break down carbohydrates. That means sugar is absorbed into your bloodstream more slowly, which helps prevent the rapid rise in blood sugar that usually occurs right after a meal. Drugs in this class include

acarbose and miglitol. Although safe and effective, alpha-glucosidase inhibitors can cause abdominal bloating, gas and diarrhea. If taken in high doses, they may also cause reversible liver damage.

Thiazolidinediones. These drugs make your body tissues more sensitive to insulin and keep your liver from overproducing glucose. Side effects of thiazolidinediones, such as rosiglitazone and pioglitazone hydrochloride, include swelling, weight gain and fatigue. A far more serious potential side effect is liver damage. The thiazolidinedione troglitzeone was taken off the market in March 2000 because it caused liver failure. If your doctor prescribes these drugs, it's important to have your liver checked every two months during the first year of therapy. Contact your doctor immediately if you experience any of the signs and symptoms of liver damage, such as nausea and vomiting, abdominal pain, loss of appetite, dark urine, or yellowing of your skin and the whites of your eyes (jaundice). These may not always be related to diabetes medications, but your doctor will need to investigate all possible causes.

Drug combinations. By combining drugs from different classes, we may be able to control blood sugar in several different ways. Each class of oral medication can be combined with drugs from any other class. Most doctors prescribe two drugs in combination, although sometimes three drugs may be prescribed. Newer medications, such as Glucovance, which contains both glyburide and metformin, combine different oral drugs in a single tablet.

DIFFERENTIAL THERAPY

Diabetes in Traditional Chinese Medicine is divided the disease into five stages, representing a progression from simple yin deficiency to complete break down of the body systems (note that "impairment" is more severe than deficiency, in that it involves active degradation):

I. Yin deficiency; preclinical stage.

II. Yin deficiency produces internal heat; early clinical manifestation

III. Impairment of both qi and yin; early stage of complications

IV. Impairment of qi, yin, and yang; stage of intermediate complications

V. Failure of qi, yin, and yang; stage of advanced complications

Yin deficiency tongue looks thin, small, dry and the color is pretty red (Fig. 1). The symptom of yin deficiency are people feels chronic fatigue; dry mouth; poor mental ability to study, analyze, or remember things; shallow sleep; weakness in lower back; reduced sex ability, night sweet and dry mouth; frequent night urine

Fig. 1. Yin deficiency tongue

When the Yin is less, the Yang will be relatively more or extra in the body, to show a kind of, what we called floating fire. The fire tends to "burn" in mouth to cause ulcer in tongue as map tongue (part of the tongue is pearled off, so as looks as a map); to burn gum to cause bleeding, to burn the lung to cause cough bleeding; to burn in ear to cause ear ringing; to burn stomach to cause dry mouth and discomfort in stomach, with hungry feeling but cannot eat lots; burn in colon to cause constipation, to burn in skin to cause multiple muscle pain.

Fig 2. Red tongue with yellow, thick and greasy coating

Blood should circulate in the body smoothly. If there is any block in any part of the body, we call it blood stagnation. It is quite common in patient with long time illness, since many other pathological condition could contribute to the stagnation of circulation. The tongue suggesting blood stagnation looks as dark and purple spots on the tongue and/or bigger veins under the tongue (Fig 3.). Usually, you can also find bigger blood clot in women menstruation blood (if the stagnation is in the uterus); or sharp pain in the body, such as coronary heart disease; or various veins in the legs

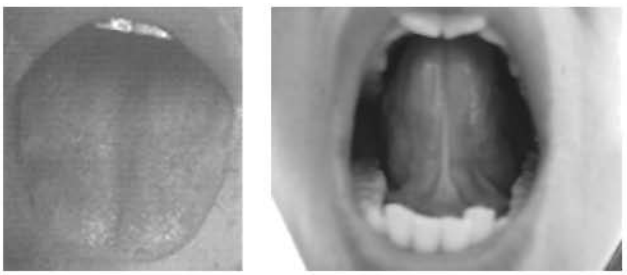


Fig 3. The tongue suggesting blood stagnation

There are the base formula of 8-12 herbs was presented to treat Diabetes Mellitus as complementary treatment. Among the herbs used in the formulas listed below, there is frequent reference to a few that are known as hypoglycemic agents. These are (number of formulas that include each herb in parentheses):

1. pueraria (*gegen*) = *Pueraria lobata* root
2. rehmannia (*dihuang*) = *Rehmannia glutinosa* root
3. trichosanthes (*tianhuafen*) = *Trichosanthes kirilowii* root
4. scrophularia (*xuanshen*) = *Scrophularia ningpoensis* root
5. salvia (*danshen*) = *Salvia miltiorrhiza* root
6. polygonatum (*huangjing*) = *Polygonatum sibiricum* root

7. ho-shou-wu (*heshouwu*) = *Polygonum multiflorum* root

8. ophiopogon

Pueraria (*gegen*) = *Pueraria lobata* root (Indonesian name : Kunzu)

In diabetes *Pueraria lobata* root is used with Ophiopogon root (Maidong), Trichosanthes root (Tianhuafen) and Fresh rehmannia root (Shengdihuang)

Rehmannia (*dihuang*) = *Rehmannia glutinosa* root

In traditional Chinese medicine (TCM) the unprocessed rehmannia root is used to reduce heat in the blood, to nourish yin and promote the production of body fluid. In Western herbal medicine, rehmannia is looked upon as an adrenal tonic; and is believed to support the cells of the adrenal cortex and pituitary during times of prolonged stress. Rehmannia is suitable for use in patients with hypertension (high blood pressure)

Trichosanthes (*tianhuafen*) = *Trichosanthes kirilowii* root

The root is especially useful for inflammations. It is also applied in case of lung heat, where hard-expectorating phlegm is accompanied by dryness. It induces fluid production in the body, thus promoting expectoration. The herb eliminates toxins, found in breast abscesses, carbuncles, sores, pus, and induced by inflammations. It may be applied both as a topical and an oral remedy when necessary.

Scrophularia (*xuanshen*) = *Scrophularia ningpoensis* root

The major active components of the root are iridoids and phenylpropanoids. Chinese Pharmacopoeia specifies that the content of harpagoside shall not be less than 0.050% determined by liquid chromatography in order to control the quality of the medicinal materials.

Pharmacological studies indicate that Scrophularia ningpoensis has anti-inflammatory, anti-bacterial, anti - platelet aggregation, and hypotensive effects, etc.
In traditional Chinese medicine theory, Xuanshen cools the blood, nourishes Yin, drains fire, and resolves toxicity

Applications of *Scrophularia ningpoensis* root are (1) Febrile diseases, polydipsia, diabetes, (2) Sore throat, boils, scrofula, (3) Consumptive cough, asthenic fever, (4) Constipation, and (5) Hypertension.

Salvia (*danshen*) = *Salvia miltiorrhiza* root (Indonesian name: Akar Sage Merah)

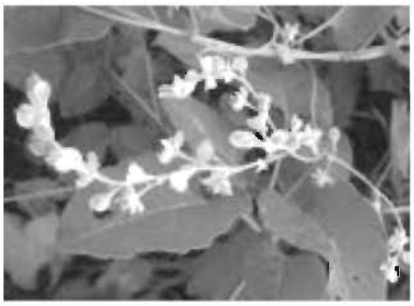
Danshen (*Salvia miltiorrhiza*) is widely used in traditional Chinese medicine (TCM), often in combination with other herbs. Remedies containing danshen are used traditionally to treat a diversity of ailments, particularly cardiac (heart) and vascular (blood vessel) disorders such as atherosclerosis ("hardening" of the arteries with cholesterol plaques) or blood clotting abnormalities. The ability of danshen to "thin" the blood and reduce blood clotting is well documented, although the herb's purported ability to "invigorate" the blood or improve circulation has not been demonstrated in high-quality human trials. Constituents of the danshen root, particularly protocatechualdehyde and 3,4-dihydroxyphenyl - lactic acid, are believed to be responsible for its vascular effects. Because danshen can inhibit platelet aggregation and has been reported to potentiate (increase) the blood-thinning effects of warfarin, it should be avoided in patients with bleeding disorders, prior to some surgical procedures, or when taking anticoagulant (blood-thinning) drugs, herbs, or supplements.

Polygonatum (*huangjing*) = *Polygonatum sibiricum* root

Chinese herbal drugs, Trichosauthes kirilowii (TK), Polygonatum sibiricum (PS), Scrophularia ningpoensis (SN), Anemarrhea asphodeloides (AA) were selected for the study of their effects on the binding of insulin with human erythrocyte insulin receptor. The results indicated that TK, PS, SN did not increase nor decrease the insulin receptor binding rate, whereas AA provoked a marked inhibiting effect on the rate of binding (p less than 0.01). These findings cannot completely deny the beneficial effect of the compound prescription of these drugs in the treatment of diabetes mellitus because of the following reasons: (1) The experiments were done in vitro but not in vivo and the erythrocytes from normal men but not from diabetics. (2) The drugs were not put together during

exaction as in the traditional manner, but was studied separately. (3) The fact that there is no effect on insulin receptor binding cannot rule out their beneficial effect on other aspects of insulin or insulin secretion even on the amelioration of tissue insulin resistance. In diabetes Diabetes *Polygonatum sibiricum* is used with Astragalus root (Huangqi), Trichosanthes root (Tianhuafen), Ophiopogon root (Maidong) and Fresh rehmannia root (Shengdihuang)

Ho-shou-wu (*heshouwu*) = *Polygonum multiflorum* root



Polygonum multiflorum had a calming effect on the hearts of various laboratory animals. Laboratory animals who were fed *Polygonum multiflorum* showed fewer atherosclerotic lesions and lower blood cholesterol levels than animals of the control group fed with cholesterol only. Clinical evidence supports the moderate anti-hypercholesterolemia effect of *Polygonum multiflorum*.

Because of *Polygonum multiflorum*'s reputation and an anti-aging, longevity herb, various studies have been conducted to determine the nature of this activity. Studies have demonstrated that laboratory various animals fed *Polygonum multiflorum* in their diets lived longer than control animals.

Research has demonstrated that *Polygonum multiflorum* can very significantly increase superoxide dismutase (SOD) activity. SOD is a powerful natural antioxidant and free radical scavenger that has been demonstrated to have powerful anti-aging benefits in humans. *Polygonum multiflorum* also inhibits b -monoamine oxidase (b -MAO). Both of these factors contribute to the anti-aging effects of this herb.

Polygonum multiflorum has been demonstrated to help strengthen the membranes of erythrocytes (red blood cells) and to promote the growth and development of erythrocytes. *Polygonum multiflorum* has been found to induce the production in human beings of g-interferon.

The tuberous root, the part of the plant used herbally under the name *Polygonum multiflorum*, contains lecithin and anthraquinones, free or conjugated. The tuberous root also contains more than 1.2% of a substance known as 2,3,5,4-tetrahydroxystilbene-2-0-b-D-glucoside, which is considered to be the principle active constituent.

Polygonum is found in a very large variety of products. It is most commonly the primary herb in essence-building, blood tonifying longevity formulas. Remember that there are different grades of this herb and the quality of a product is dependent upon the selection of raw material.

Ophiopogon (Indonesian name : lilililian)

In Chinese medicine the tuber of *Ophiopogon japonicus*, known as mai men dong, is the cardinal herb for yin deficiency. According to the Chinese Herbal Medicine Materia Medica, the herb is sweet, slightly bitter and slightly cold, enters the heart, lung and stomach channels and nourishes the yin of the stomach, spleen, heart and lungs and clears heat and quiets irritability. It is used for hacking dry coughs, dry tongue and mouth and constipation

Ophiopogon also moistens the mucous membranes of the body by stimulating the production of mucosal fluids. Moisturizing of the lungs reduces coughing. In the intestines, increasing the level of moisture improves elimination. Because of these qualities, ophiopogon is used in formulas to treat constipation, dry throat, and chronic dry bronchitis. Because ophiopogon has been shown to lower blood sugar and regenerates necessary cells in the pancreatic isles of Langerhans, it is also considered useful in treating the fluid imbalance caused by diabetes, as evidenced by excessive thirst and urination.

CONCLUSION

- Type 1 diabetes (also known as Insulin Dependent Diabetes Mellitus (IDDM)) is where the body does not produce insulin, so replacement insulin must be delivered by injection or pump. Type 2 diabetes (or Non Insulin Dependent Diabetes Mellitus (NIDDM)) patients may be able to control their blood glucose levels by an oral medication
- There are the base formula of 8-12 herbs was presented to treat Diabetes Mellitus as complementary treatment. These formula use herbs such as *Pueraria lobata* root, *Rehmannia glutinosa* root, *Trichosanthes kirilowii* root, *Scrophularia ningpoensis* root, *Salvia miltiorrhiza* root, *Polygonatum sibiricum* root, *Polygonum multiflorum* root, and ophiopogon

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