

A Clinical Report on a Patient with Type 2 Diabetes

Ae-sook Shin, Ja-young Gwak, Seung-yeon Cho, In-whan Lee, Hye-mi Kim,
Na-hee Kim, Sung-wook Park, Jung-mi Park, Chang-nam Ko, Hyung-sup Bae

Stroke & Neurological disorders center, East-West Neo Medical Center, Kyung Hee University

Type 2 diabetes mellitus (T2DM) is a progressive disorder caused by a combination of insulin resistance and β cell dysfunction.

Sogal(消渴) is a traditional Korean medical term referring to a condition pertaining 3 major symptoms – thirst, polyphasia, polyuria, Sogal has been reported to have similar characteristics with DM.

This case report demonstrates a patient with T2DM complaining of typical Sogal symptoms. We diagnosed him as So-yang person Sogal and treated him with acupuncture and herbal medicine.

Key Words : Type 2 diabetes mellitus, Sogal(消渴)

Introduction

Type 2 diabetes mellitus (T2DM) is a progressive disorder caused by a combination of insulin resistance and β cell dysfunction¹⁾.

History of diabetes remains independent predictor of death 3 months after intracerebral hemorrhage (ICH)²⁾. Also National Institutes of Health Stroke Scale (NIHSS) score change is also affected by diabetes alone³⁾. Thus, DM affects both mortality and recovery from ICH.

In traditional Korean medicine, DM can be most relevant to Sogal in its conditions and symptoms⁴⁾.

We would like to share a case report, in which a patient with T2DM diagnosed 3 years ago completely recovered from T2DM after 5 months of acupuncture and herbal medicine along with regular physical therapy(exercise). Insulin and oral antidiabetic drugs

were co-administered but over time they weren't needed anymore.

Case

1. Patient : Jang ○ ○ (M/37)

2. Impression

T2DM - 2005 year

Hypertension(HTN) - 2005 year

ICH - 2008-08-24

3. Chief Complaint

feeling of rigidity below the heart, dry mouth, thirst, red tongue

4. Family History

Both of his parents had HTN and DM. His mother and all of his grandparents suffered from cerebrovascular attack(CVA).

Corresponding Author : Chang-nam Ko
Address : Seoul Gangdong-gu Sangil-dong 149
Tel : 02-440-6215 Fax : 02-440-6296 E-mail : kcn202@khu.ac.kr
Stroke & Neurological disorders center, East-West Neo Medical Center,
Kyung Hee University

5. Social History

He had been drinking moderately and smoking a pack of cigarettes a day for the last 18 years.

6. Present Illness

He was first diagnosed with T2DM and HTN in 2005 but didn't take any medication.

On 2008. Aug. 24th he visited a hospital for ICH. After 4 weeks of conservative management for stroke including insulin therapy for T2DM, he was transferred to the Stroke and Brain disorders Center at East-West Neo Medical Center on 22nd September in 2008. At admission, his HbA1C was 9.0 (%) indicating his poor glucose control over the last 3 months despite the insulin therapy he received for a month.

7. Systemic review

- 1) Listening and Smelling Examination, Inquiry, Palpation
 - ① shallow sleep, hard to fall asleep due to vexation and feeling of rigidity below the heart
 - ② profuse sweating
 - ③ heat intolerance
 - ④ paralytic esotropia after stroke onset
 - ⑤ dry eyes
 - ⑥ facial palsy after stroke onset
 - ⑦ dysarthria after stroke onset
 - ⑧ left ear deafness & right ear stuffiness
 - ⑨ dry mouth, thirst
 - ⑩ once/1~3 days defecation
 - ⑪ dysuria after stroke onset
 - ⑫ red tongue

- ⑬ thick yellow tongue coating
- ⑭ halitosis
- ⑮ string-like pulse

2) Vital sign at admission

Blood Pressure 151/90mmHg Pulse rate 89bpm

Respiration rate 20/min Body

Temperature 37.2°C

3) Electrocardiography : sinus tachycardia

8. Lab findings (Table 1.)

9. Treatment

1) Acupuncture

Sa-am acupuncture therapy, Electro-acupuncture(EA) on face, Moxibustion on CV4(Guan Yuan, 關元)

2) Herbal Medicine and Components(Table 2.)

3) Insulin & Western Medication

Lantus 12 U at 9 PM

Novorapid 10 U-10 U-10 U before every meal (3 times a day)

Diamicron MR tab.30mg 2T qd

Megaformin SR 500mg 1T qd

Mevalotin tab.20mg 1T qd

Concor tab.5mg 1T qd

Coniel tab. 4mg 1T bid

Tritace tab.5mg 1T bid

Pantoloc tab. 20mg 1 T qd

Table 1. Lab findings at Admission and Follow-Up in 3 Months

Lab result	Admission(2008-09-22)	Follow-up(2009-01-12)
Glucose (PP2)	184 (mg/dL)	141(mg/dL)
Glucose (FBS)	142(mg/dL)	74(mg/dL)
HbA1C	9.0(%)	4.9 (%)

Table 2. Herbal Medication and Components

09-23 ~ 10-10	<i>Yanggyuksanwha-tang</i>	<i>Radix Rehmannie Crudus</i> (8), <i>Caulis Loniceræ</i> (4), <i>Fructus Forsythiae</i> (8), <i>Herba Menthae</i> (4), <i>Fructus Gardeniae</i> (4), <i>Spica Nepetae</i> (4), <i>Rhizoma Anemarrhenae</i> (4), <i>Fibrosium Gypsum</i> (4), <i>Radix Ledebouriellac</i> (4)
10-11 ~ 10-24	<i>Hyungbangjihuang-tang - Radix Rehmanniae Preparata+Rehmanniae Radix Crudus</i>	<i>Radix Rehmannie Crudus</i> (8), <i>Fructus Corni</i> (8), <i>Poria</i> (8), <i>Rhizoma Alismatis</i> (8), <i>Rhizoma Notopterygii</i> (4), <i>Herba Schizonepetae</i> (4), <i>Radix Saposhinkoviae</i> (4), <i>Semen Plantaginis</i> (4), <i>Radix Angelicae Pubescentis</i> (4)
10-25 ~ 12-06		+ <i>Fibrosium Gypsum</i> (4 ~ 30)
12-07 ~ 12-09	<i>Jihuangbakho-tang</i>	<i>Rhizoma Anemarrhenae</i> (8), <i>Radix Angelicae Pubescentis</i> (4), <i>Radix Ledebouriellac</i> (4), <i>Fibrosium Gypsum</i> (20), <i>Radix Rehmannie Crudus</i> (16)
12-10 ~ 01-02		+ <i>Fibrosium Gypsum</i> (8 ~ 20)
01-03 ~ 01-12	<i>Hyungbangjihuang-tang</i>	<i>Radix Rehmannie Preparata</i> (8), <i>Fructus Corni</i> (8), <i>Poria</i> (8), <i>Rhizoma Alismatis</i> (8), <i>Rhizoma Notopterygii</i> (4), <i>Herba Schizonepetae</i> (4), <i>Radix Saposhinkoviae</i> (4), <i>Semen Plantaginis</i> (4), <i>Radix Angelicae Pubescentis</i> (4)
01-13 ~ 01-21		+ <i>Cortex Lycii radicis</i> (4), <i>Rhizoma Gastrodiae</i> (2), <i>Coptidis Rhizoma</i> (2)

The number in () represents the weight (in grams) of each herb comprising the prescriptions.

Table 3. Insulin, Oral Medication and Diet Change

09-23 ~ 10-02	Lantus 12 U at 9 PM Novorapid 10U (3 times /day) +Diamicon MR tab.30mg 2T qd Megaformin SR 500mg 1T qd	
10-03 ~ 10-28	Novorapid D/C, Lantus 12U -> 2U	DM 1800
10-29 ~ 12-22	Lantus D/C	
12-23 ~ 01-12	Megaformin D/C	
01-13 ~ 01-22	Diamicon 1T	
01-23 ~ 02-24	Diamicon D/C	GD

U: Unit, D/C: Discontinue, DM: Diabetes Mellitus, GD: General Diet

10. Clinical course

- 1) Insulin, Oral Medication and Diet Change (Table 3.)

Discussion

T2DM is a progressive and complex disorder that is difficult to treat. It is associated with an increased and premature risk of cardiovascular disease as well as specific microvascular complications such as retin-

opathy, nephropathy and neuropathy⁵). With these complications T2DM also predicts early death during the acute phase after ICH² and delays recovery from ICH³.

β cell dysfunction was thought to be progressive and irreversible. However, it has been suggested that thiazolidinediones (TZDs), when used either as add-on therapy or when appropriate as monotherapy, may conserve pancreatic beta-cell function over an observed 3- to 5-year period of time and sustain a decrease in A1C ranging from 0.5%-1.5%⁶).

In the UK Prospective Diabetes Study(UKPDS), many subjects maintained glycemic goal(HbA1c < 7.0%) at 9 years, showing that β cell function was preserved and that the initial decline in β cell function recovered with sulphonylureas at the onset of illness and even in the later stage of the disease⁷⁾.

Traditionally, DM treatment has focused primarily on glycemic control, but accumulating evidence suggests that the clinical management of patients with T2DM requires a more comprehensive approach to minimize associated morbidity and mortality. Most conventional antidiabetic agents, including sulphonylureas, thiazolidinediones, and insulin, improve glycemic control but are associated with weight gain or, as with metformin, are weight-neutral or weight-sparing⁸⁾. The most significant adverse effects of sulphonylureas are: 1) hypoglycemia which occurs in 2 to 4% of patients per year and 2) weight gain (approximately 4 to 6 kg). Additionally, less common side effects include dermatological and hematological reactions and gastrointestinal disturbances⁹⁾.

The patient was admitted to the hospital one month after the onset of ICH and his HbA1c at admission showed 9.0% indicating poor glucose control for the last 3 months. Elevated HbA1c alone is not the diagnostic criteria for DM but in this case, he stated that he had diagnosed with DM in 2005. He started Insulin therapy on the day of the onset, which was 24th August in 2008 and started oral antidiabetic drugs on 3rd October in 2008 due to uncontrolled glucose levels.

Since 4th October, he became hypoglycemic so we had to discontinue Novorapid before every meal and reduce the amount of Lantus from 12 unit to 2 unit over the course of 22 days, finally discontinued it completely on 22nd December. He still became hypoglycemic in the morning so we discontinued Megaformin on 23rd December and in 3 weeks Diamicon was reduced from 2 tablets to 1 tablet. On 24th February he was able to main normal glycemia levels (fasting glucose level of < 126ml/dl and

post-meal glucose level of < 200ml/dl) without any insulin or any oral medication. (Table 3)

The mechanism is not clear to be concluded from this case but according to the previous studies on herbal medicine and anti-diabetic effects^{10,11)}, herbal medicine has shown to have effects in blood and urine glucose levels, body weight and the histopathological changes in the pancreas. Complementing the possible adverse effect of antidiabetic medicine, traditional Korean herb medicine achieved normal levels of glucose without any side effects. In this case, the patient didn't have glucose in urine. Hi Hui et al¹²⁾ also stated that the efficacy of hypoglycemic herbs is achieved by increasing insulin secretion, enhancing glucose uptake by adipose and muscle tissues, inhibiting glucose absorption from intestine and inhibiting glucose production from hepatocytes. Further studies in humans to observe these antidiabetic effects of herbal medicine and to elucidate the mechanism of glucose lowering are required to be conducted.

From a perspective of Korean traditional medicine, this patient had symptoms of Sogal(消渴). The meaning of Sogal includes diabetes mellitus in western medicine. The pathology of Sogal is Yin-deficiency(陰虛) state caused by Dry-heat(燥熱). Usually the state of Dry-heat and Yin-deficiency(燥熱陰虛) in human body causes insufficiency of Essence and Blood(精血). So the prevention is emphasized. Moderation of lifestyle and psychological aspect are more important than diet, exercise, medicine in traditional Korean medicine¹³⁾.

With treatment based on Sa sang constitutional Korean medicine principles, the patient was categorized as Soyang person. He had symptoms of Sangso(上消) thus the use of Yanggyuksanwha-tang was appropriate. His symptoms for Sangso got better so we changed the herbal medication to Hyungbangjihuang-tang which is suitable for a condition after a disease. He still had constipation, so Fibrosium Gypsum was added in a varying dose. His constipation still didn't seem get

better, so we changed it to Jihuangbakho-tang with Fibrosum Gypsum for about a month to see the defecation frequency change regular every other day or so. Then, we used Hyungbangjihuang-tang to replenish yin for his general condition. He had herbal medicine accordingly for 5 months in total. Over time he showed improvement in defecation from once a week to once in 2 days, which plays an important role in patient's general condition and recovery of stroke^{14,15}. By then he also showed improvement in insomnia, chest rigidity, dry mouth, thirst and clearing of tongue coating, the Sogal symptoms. We observed his blood glucose levels even after he stopped taking antidiabetic medications and insulin for one month before he was discharged, and they were still being controlled very well with general diet and the same amount of exercise as before.

With regard to acupuncture it has been reported to activate glucose-6-phosphatase, promote insulin production in pancreas, and increase receptors in target cells to lower glucose levels^{16,17}. To enhance deficiency of the kidney, tonifying Gyeonggeo (LU 8), Buryu (KI 7) and reducing Taebaek (SP 3) Taegye (TI 3) was performed. EA on facial acupoints was done to relieve facial palsy.

In summary, co-administration of Korean medicine treatment and western medication in a T2DM patient has gradually reduced insulin and oral antidiabetic drugs, achieving glycemic goal of fasting glucose level of < 126ml/dl and post-meal glucose level of < 200ml/dl. After quitting insulin and oral drugs completely, the glucose levels remained controlled. The patient recovered from T2DM and stroke without further complications or adverse effects.

On a final note, big-sample sized and controlled trials with longer-term follow-ups can be designed in the future to further study the safety and efficacy of co-administration of western and Korean medicine to treat T2DM. Also insulin secretion should be also checked.

References

1. Clinical Endocrinology. Seoul: Korea medical book. 1999;349-84,394-414.
2. Tetri S, Juvela S, Saloheimo P, Pyhtinen J, Hillbom M. Hypertension and diabetes as predictors of early death after spontaneous intracerebral hemorrhage. *J Neurosurg.* 2009;110(3):411-7.
3. No JH, Choi DJ, Moon SK, Cho KH, Kim YS, Bae HS, Lee KS. Outcome of stroke management in the hospital of oriental medicine: measurement by modified barthel index and NIH stroke scale. *J of Oriental Chr Dis.* 1999;5(1):40-9
4. Eastern Medicine Nephrology. Seoul:Oriental Medicine Research Institute.1993:1173.
5. Srinivasan BT, Jarvis J, Khunti K, Davies MJ. Recent advances in the management of type 2 diabetes mellitus. *Postgraduate Medical Journal* 2008;84:524-31.
6. Stolar MW, Hoogwerf BJ, Gorshow SM, Boyle PJ, Wales DO. Managing type 2 diabetes: going beyond glycemic control. *J Manag Care Pharm.* 2008;14(5):S1-19.
7. UK Prospective Diabetes Study(UKPDS) Group. Effect of intensive blood-glucose control with metformin on complications in overweight patients with type 2 diabetes mellitus (UKPDS 34). *Lancet* 1998;12:854-65.
8. Brunton S. Beyond Glycemic Control:Treating the Entire Type 2 Diabetes Disorder. *Postgraduate Medicine* 2009;Sep;121(5):68-81.
9. Ketz J. A Review of Oral Antidiabetic Agents. Cleveland Clinic. Center for Continuing Education. 2001;4(3).
10. KIM JD, KANG SM, PARK MY, JUNG TY, CHOI HY, KU SK. Ameliorative Anti-Diabetic Activity of Dangnyosoko, a Chinese Herbal Medicine, in Diabetic Rats *Bioscience, Biotechnology, and Biochemistry* 2007;71(6):1527-34.
11. Kim JO, Lee GD, Kwon JH, Kim KS. Anti-

- diabetic Effects of New Herbal Formula in Neonatally Streptozotocin-Induced Diabetic Rats. Biological & pharmaceutical bulletin 2009;32(3):421-6.
12. Hui H, Tang, Go VL. Hypoglycemic herbs and their action mechanisms. Chin Med. 2009;4:11.
 13. Doo HK, Ahn YM, Ahn SY. A Study on the Late Complications of Diabetes in Oriental Medicine Kyunghee Medicine 1998;14(2):245-56.
 14. Yu YG, Woo YS, Choi IS, Park GE, Kim YK, Kwon JN. A Clinical Study on the Functional Outcome in Stroke. Korean J. Orient. Int. Med. 2002;23(4):679-88.
 15. Lee KA, Park SJ, Lee WC. Four Constitutional Medicine and Sweating, Defecation and Urination. Korean J. Orient. Int. Med. 1996;17(1):123-38.
 16. Chen JF, Wei J. Changes of plasma insulin level in diabetics treated with acupuncture. J Tradit Chin Med. 1985;5(2):79-84.
 17. Hu H. A review of treatment of diabetes by acupuncture during the past forty years. J Tradit Chin Med. 1995;15(2):145-54.