Diabetes Evaluation Sheet

Hisayuki Katsuyama[a], Hiroki Adachi[a], Yoshinori Masui[a], Mariko Hakoshima[a],
Yoko Waragai[a], Tadanao Harigae[a], Yusuke Kondo[a],
Takehiro Iijima[a], Hidekatsu Yanai[a, b]

Our institute, National Center for Global Health and Medicine Kohnodai Hospital treats many severe diabetic patients and studies various aspects of diabetes. To improve the quality of diagnosis and treatment for diabetes and also to accelerate studies on diabetes worldwide, here we will show our "NCGM Kohnodai Diabetes Evaluation Sheet" (Fig. 1).

This sheet includes the information about age, sex, body height and weight, body mass index, classification (etiology) of diabetes, duration of diabetes, treatments for diabetes, glycemic control, macrovascular and microvascular complications, insulin secretary capacity and insulin resistance, and coronary risk factors. In this sheet, we evaluate nephropathy according to the classification of diabetic nephropathy (The Japan Diabetes Society) made based on the study by Wada T et al [1], and we also evaluate estimated glomerular filtration rate (eGFR) category in chronic kidney disease (CKD) by using KDIGO 2012 CKD Guideline [2]. Furthermore, we evaluate insulin resistance by using homeostasis model assessment of insulin resistance (HOMA-IR), and also evaluate intrinsic insulin secretary capacity by using homeostasis model assessment of β-cell function (HOMA-β) and C-peptide immunoreactivity index (CPI index) [3, 4].

Therefore, NCGM Kohnodai Diabetes Evaluation Sheet helps us to make a valid diagnosis and an appropriate treatment for severe diabetic patients. This sheet is also very useful for educating young doctors about diabetes. We produce two to three diabetes specialists every year. Furthermore, this sheet may contribute to our research activities. We have reported 83 English original articles (total impact factor, 185.2) since 2013, by using this sheet.

We strongly hope that the diagnosis and treatment for diabetes, and research of diabetes worldwide will develop by using this sheet.

Conflict of Interest

The authors declare that they have no conflict of interest concerning this article.

References

1. Wada T, Haneda M, Furuichi K, Babazono T, Yokoyama H, Iseki K, Araki S, et al. Clinical impact of albuminuria and glomerular filtration rate on renal and cardiovascular events, and all-cause mortality in Japanese patients with type 2 diabetes. Clin Exp Nephrol. 2014;18(4):613-620.
2. Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group. KDIGO 2012 clinical practice guideline for the evaluation and management of chronic kidney disease. Kidney Int Suppl. 2013;3;1-150.
3. Matthews DR, Hosker JP, Rudenski AS, Naylor BA, Treacher DF, Turner RC. Homeostasis model assessment: insulin resistance and beta-cell function from fasting plasma glucose and insulin concentrations in man. Diabetologia. 1985;28(7):412-419.
4. Iwata M, Matsushita Y, Fukuda K, Wakura T, Okabe K, Koshimizu Y, Fukushima Y, et al. Secretory units of islets in transplantation index is a useful predictor of insulin requirement in Japanese type 2 diabetic patients. J Diabetes Investig. 2014;5(5):570-580.

[a]Department of Internal Medicine, National Center for Global Health and Medicine Kohnodai Hospital, Chiba, Japan
[b]Corresponding Author: Hidekatsu Yanai, Department of Internal Medicine, National Center for Global Health and Medicine Kohnodai Hospital, 1-7-1 Kohnodai, Ichikawa, Chiba, 272-8516, Japan. Email: dyanai@hospk.ncgm.go.jp

NCGM Kohnodai Diabetes Evaluation Sheet

Name _____ Age _____ Sex _____

Weight (kg) _____ Height (cm) _____ BMI (kg/m²) _____

Classification

| 1. Type 1 |
| 2. Type 2 |
| 3. Gastational (GDM) |
| 4. Specific types |
| 1) Neonatal diabetes   2) MODY |
| 3) Dibetes due to pancreatic diseases |
| 4) Drug- or chemical-induced diabetes 5) Others |

Diabetes Duration (Years) _____

Treatments for Diabetes

Glycemic Control

| Plasma Glucose (mg/dl) | | HbA1c (%) | | GA (%) | |

Complications of Diabetes

Neuropathy	Symptom				
	Pinprick				
	Vibration	s	s	CVR-R %	
Retinopaty	No DR	mild NPDR	moderate NPDR	severe NPDR	PDR
Nephropathy	Microalbumin		mg/g·Cr		mg/day
	eGFR		DN Stage	CKD GFR category	
Macrovascular Complications	ABI	R	L	PWV R	L
	ECG				
	UCG				

Diabetic nephropathy (DN) Stages			GFR categoires in CKD	
	eGFR (ml/min/1.73m²)	albiminuria		eGFR
Stage 1	≥ 30	Normal albuminuria: urinary albumin <30 mg/day	G 1	≥ 90
Stage 2	≥ 30	Microalbuminuria: urinary albumin 30 – 299 mg/day	G 2	60-89
Stage 3	≥ 30	Macroalbuminuria: urinary albumin ≥ 300 mg/day	G 3a	45-59
Stage 4	< 15		G 3b	30-44
Stage 5	Dialysis		G 4	15-29
			G 5	< 15

Insulin Secretion

	Fasting	(2-hour after meal) or (6-min after glucagon load)
Plasma Glucose (mg/dl)		
Plasma Insulin (µIU/l)		
Plasma C-peptide (ng/ml)		
Urine C-peptide (µg/day)		
HOMA-IR		
HOMA-β		
CPR index		

Insulin-dependance

dependent   non-dependent

HOMA-IR = fasting insulin * fasting glucose /405 (≥ 2.5: insulin resistant)
HOMA-β = 360 * fasting insulin / (fasting glucose-63) (≥ 40: normal)
CPR index = fasting C-peptide *100 / fasting glucose (<1.2: probably prefer to insulin therapy)

	Fasting CPR	CPR after glucagon load	ΔCPR (after glucagon load)	Urinary CPR
Insulin dependent	≤ 0.5 ng/ml	≤ 1.0 ng/ml	≤ 0.5 ng/ml	≤ 20 µg/day
Insulin non-dependent	≥ 1.0 ng/ml	≥ 2.0 ng/ml		≥ 30 µg/day
prefer to insulin therapy		≤ 1.8 ng/ml	≤ 0.7 ng/ml	≤ 30 µg/day

Coronary Risk Factors

Blood pressure (mmHg)	
LDL-C (mg/dl)	
HDL-C (mg/dl)	
TG (mg/dl)	
Smoking (pack-years)	

Desidered values
- Blood pressure (for diabetic patients) <130/80
- LDL-C < 120 mg/dl (< 100; secondary prevention)
- HDL >40 mg/dl
- TG < 150 mg/dl

ABI, ankle brachial pressure index; CKD, chronic kidney disease; CPR-Index, C-peptide immunoreactivity index; CVD, cardiovascular diseases; CV-RR, coefficient of variation of R-R interval; DR, diabetic rerinopathy; eGFR, estimate glomerular filtration rate; ECG, electrocardiogram; GA, glycated albumin; HOMA-IR, homeostasis model assessment of insulin resistance; MODY, maturity onset diabetes of the young; NPDR, nonproliferative diabetic retinopathy; PDR, proliferative diabetic retinopathy; PWV, pulse wave velocity; UCG, ultrasonic echocardiography

Figure 1. NCGM Kohnodai Diabetes Evaluation Sheet