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Quality of diabetic care and complication status in Prapoklao Hospital

สุรัช นาคะวิโรจน์ พ.บ.*
วราภรณ์ พลเมือง พ.บ.*

Abstract **Quality of diabetic care and complication status in Prapoklao Hospital**

Surat Nakaviroj M.D.*

Waraporn Polamaung M.D.*

* Department of Medicine, Prapokklao Hospital Chanthaburi Province,Thailand.

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Objective : This retrospective study described the characteristic of diabetic patient, diabetes management, diabetic control and complication status among patient managed in OPD unit of Propoklao Hospital during the year 2007.

Material and method: The population of this study were all diabetic patients who visit OPD during the year 2007 A simple random sampling (1:13) was used to recruit the patients. Medical records were reviewed. Demographic data, type and duration of diabetes, risk factor, diabetes management and diabetic complications were collected and analyzed for prevalence of complication and association between risk factor, diabetes management and diabetes complication.

Results : There were 303 diabetic patients recruited in the study. Mean ± SD of age, onset age and diabetes duration were 62.31±11.58, 54.59±11.42, 7.61±5.23

* *ภาควิชาอายุรศาสตร์ โรงพยาบาลพระปกเกล้า*

years, respectively. Female were 62.4 percent and type 2 diabetic patients were 98.7 percent. Current smoking and alcoholic drinking was observed in 2.3 percent and 1.3 percent respectively. Overweight (BMI 23.0-24.9 kg/m^2) and obesity were noted in 16.7 percent and 52.8 percent of the patients. Mean ±SD of FPG was 152.92 mg/dL and HbA1C was 7.66±1.56 percent. The percentage of patients with FPG was 90-130 mg/dL and 70-130 mg/dL were 27.7, 28.1 respectively. Whereas the percentage of patients with HbA1C below 7percent was 40.3 percent and HbA1C below 6.5 percent was 24.4 percent. Annual checkup for eye and foot examination was performed in 33.7 percent and 50.8 percent of the patients, respectively. Twice check up of HbA1C and annual checkup for lipid profile, serum creatinine, urinary protein, urine microalbumin were observed in 40.6 percent (72.9 percent annual of HbA1C), 72.3 percent (lipid profile), 78.9 percent (Cr), 5 percent (urine albumin), 36.4 percent(urine protein), of the patient, respectively. The prevalence of macrovascular complications included ischemic stroke 6.9 percent follow by NSTEMI/UA 6.6 percent and the prevalence of microvascular complication included retinopathy 5 percent, nephropathy 9.9 percent,and peripheral neuropathy 19.5 percent.

Conclusion : The present study demonstrated that necessary routine assessments were not regularly practiced by practitioner, especially annual albumin examination. Only 1/3 of patients achieved goal of glycemic control and peripheral neuropathy were the most common observed complications.

INTRODUCTION

Diabetes is a large and growing global health problem. It also is a common chronic disease with increasing burdens in Thailand. In each year, prevalence of DM was increased. According to the cross country survey in the InterAsia study, the prevalence of type 2 diabetes in Thailand was raising to 9.6 percent during the year 2000.[1]

The DM patterns remain unchanged from previous studies which are more prevalent in female groups and frequently affect population age 45 year and older.[1,2] Both microvascular and macrovascular complications are the burden of disease not only in terms of individual health and well-being but also in having an impact on the economic status of their families and the country.[3,4]

During the past decade, several

efficacious treatments strategies to prevent or delay diabetes complication had emerged included control of glycemia, lipids and hypertension; early detection and treatment of diabetic retinopathy, nephropathy and foot disease ; therapy with angiotensin-converting enzyme inhibitor; and influenza and pneumococcal vaccine.[5-12]

At Eastern region, Propoklao Hospital is the tertiary care hospital where 5000 diabetic patients were cared per years. Unfortunately, my hospital doesn't have own data about the diabetic management and diabetic complication. So, this study was designed to describe the diabetes management and control as well as complication status of the patients who were managed in outpatient department.

MATERIAL AND METHODS

Study design

This was a retrospective study carried out in out-patient department of Prapoklao hospital, in Chanthaburi Province, Eastern Thailand.

All diabetic patients who were cared and treated at the out-patient department for at least 12 months were recruited. The sample size was calculated based on ability of the study to detect diabetic retinopathy. A previous study in[9,419] patients with type 2 diabetes reported the prevalence of diabetic retinopathy was 30.7 percent. The author expected 5 percent error (e) to detect diabetic retinopathy with a 95 percent confidential interval for the sample size calculation using the following formula

$$n = \frac{Z^2_{\alpha/2} P(1-P)}{e^2}$$

Block of randomization was used to recruit the patients. In this study, 303 from 4485 diabetic patients were recruited for analysis. The exclusion criterias were 1. Gestational diabetes, 2. Diabetes patients who were follow up less than 12 months, 3.Incomplete medical records. Definition of DM and the classification of DM were defined according to the American Diabetic Association (ADA2007, ADA 2008)[13,14]

Data collection and measurements

Data was collected by reviewing patient medical records and laboratory assessments. Their medical records were included demographic data, type and duration of diabetes, risk factor (smoking and alcoholic consumption), and diabetic complications. The results of laboratory assessments performed during the 12 months of recruitment were accepted for analysis. Criteria of control was base on the published recommendation (ADA 2007, ADA 2008)[13,14]

Statistical analysis

Statistical analysis was performed by

using SPSS 11.5. The demographic data, type and duration of diabetes were expressed as mean, standard deviations (SD), and percentages. The diabetic management, glycemic control and complication were expressed as percentages. Comparisons of risk factor and diabetes management between population subgroups were performed by using unpaired Student's T test for continuous variables data and X^2 test (chi square) for categorical variable data.

RESULTS

Three hundred and three patients were sampling from 4485 diabetes patients who were treated at out-patient department during the year 2007. The proportion of males to females was consistently 1:1.65. Their mean ± standard deviations of age, onset age and diabetes duration were 62.31 ± 11.59, 54.59 ± 11.42, 7.61 ± 5.23 years, respectively. 98.7 percent of the patients were type 2, 0.7 percent of the patients were type I, and only 0.3 percent of the patients were diabetes other type. The mean ± standard deviations of body mass index (BMI) was 25.34 ± 4.05 kg/m^2. Over weight; BMI 23.0-24.9 kg/m^2 and obesity; BMI ± 25 kg/m^2 were noted in 16.7 percent and 52.8 percent of the patients, respectively. Current cigarette smoking was observed in 2.3 percent meanwhile, regular alcohol drinking was noted in 1. 3 percent. Most of the female diabetic patients were menopause (93.2 percent). Mean of follow up time was 5.8 times/year. After including other non-DM visit, mean of follow up time was 6.67 times/year. About 55.1 percent of diabetic patient were treated at OPD medicine. 38 percent of diabetic patients were cared by general practitioner (GP), follow by staff (36.6 percent) and internist (0.3percent).

The demographic and baseline characteristic of patients were presented in table 1.

Annual check up

Monitoring of glycemic control was done by measurement of fasting plasma glucose (FPG) and HbA1C. Frequency of FBS monitoring was 5.61±1.81per year with a range of 0-12 measurements per years. Biannual check up of HbA1C was observed in 40.6 percent and annual checkup for lipid profile was observed in 72.3 (68.3 percent of TC, 69 percent of TG, 58.4percent of HDL). Annual checkup for the others was shown in figure.1

FBS, BP and Lipid control

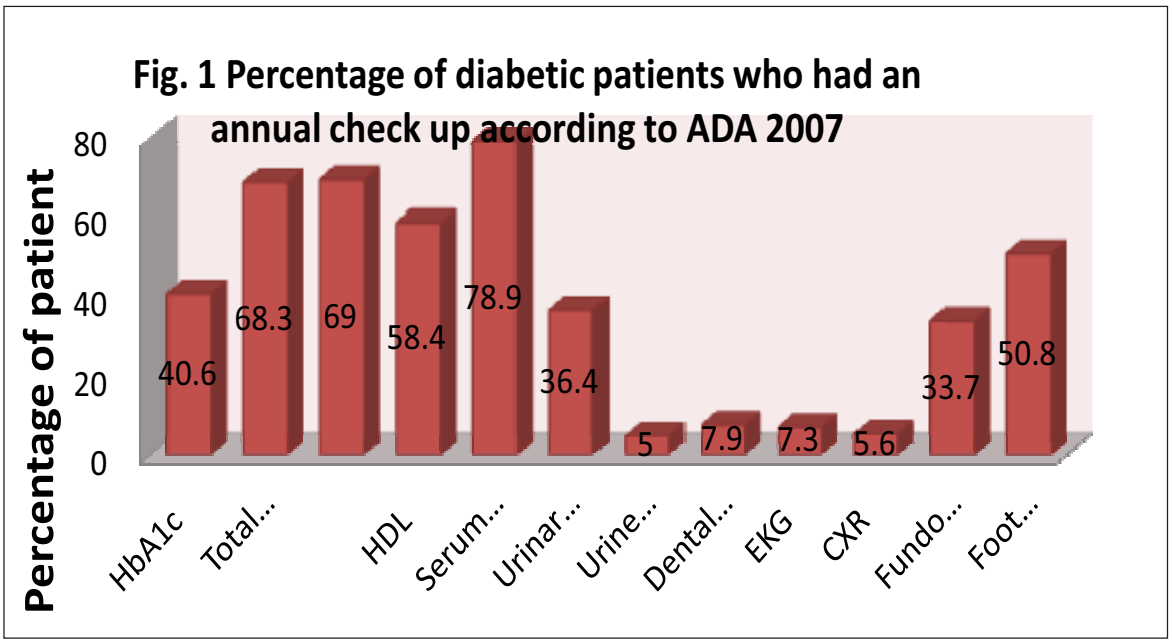
The mean ± standard deviations of fasting plasma glucose was 152.92 ± 35.23mg/dl and HbA1C was 7.66 ± 1.56 percent. The percentage of patients with FPG between 90-130 mg/dL, 70-130 mg/dL and 70-110 mg/dL were 27.7percent, 28.1 percent and 4.3 percent respectively. The percentage of patients with HbA1C <7

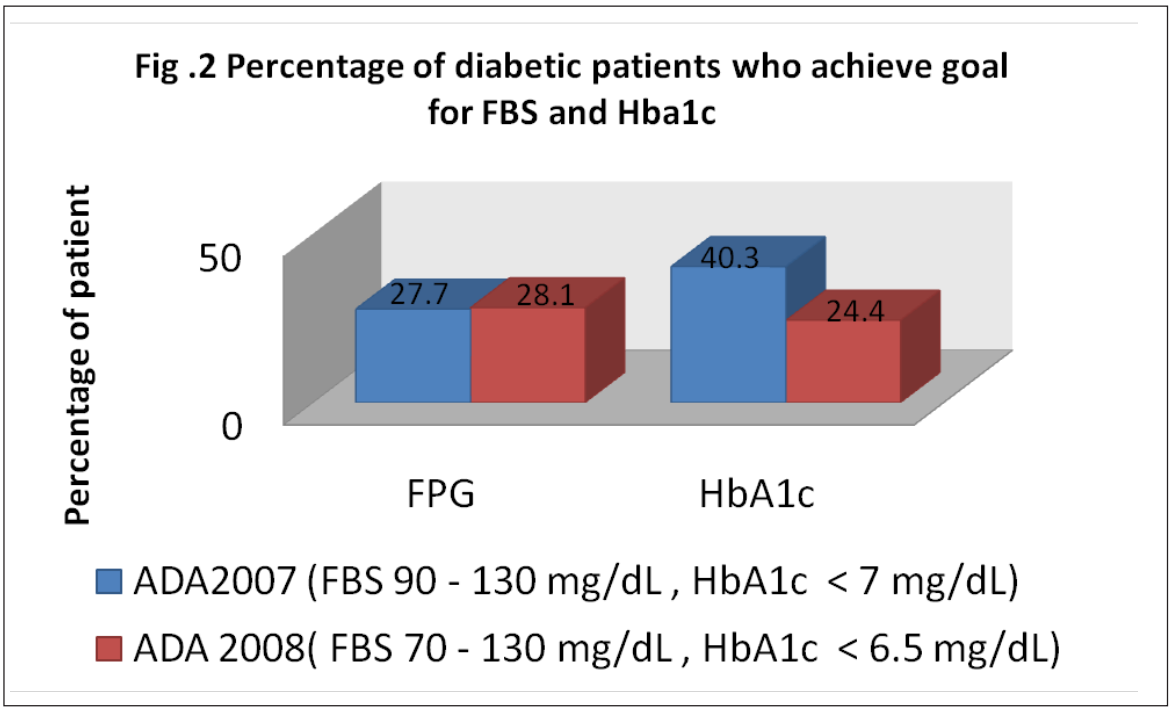
Table 1. The demographic and baseline haracteristic of diabetic patients

Baseline characteristic	Value	Baseline characteristic	Value
Age (y)	62.31±11.59	Systolic BP	131.79±17.63
Sex (male: female)	1:1.65	Diastolic BP	77.76±9.27
Age of onset	54.59±11.42	Time FBS measurement	5.61±1.81
Diabetes duration	7.61±5.23	FPG (mg/dl)	152.92±35.23
Type of DM (percent) Type 1 Type 2 Other type	 0.7 98.7 0.3	Time HbA1c measurement	1.41±1.56
		HbA1c	7.62±1.56
Height	158.56±7.19	Total cholesterol (mg/dl)	187.34±39.77
weight	63.68±12.03	Triglyceride (mg/dl)	170.05±77.72
BMI	25.34±4.05	HDL (mg/dl)	45.42±12.17
Total Visit time	6.67±2.30	LDL(mg/dl)	104.84±33.53
Attend follow up DM	5.83±1.80	Place (OPD med : GP)	1 : 0.81
Loss follow up DM	0.07±0.03	Creatinine (mg/dl)	1.24±1.05

percent and 6.5 percent were 40.3 percent and 24.4 percent, respectively. (Fig. 2)

Their mean ± standard deviations of SBP and DBP were 131.79 ± 17.63 mmHg and 77.76 ± 9.27 mmHg. The percentage of patients with achieve goal of SBP (SBP < 130 mmHg) and DBP (DBP < 80 mmHg) were 64 percent and 79.5 percent respectively. One-third of the patient 32.67 percent use diet control and lifestyle modification and 32.67 percent of patient use single antihypertensive drug where as 25.34 percent,





7.6 percent and 1.32 percent of patient use two, three and four drugs for control HT respectively.

The frequently prescribed antihypertensive drugs were ACEIs and β-blockers in 69.5 percent and 26.07 percent respectively. (Table 2)

Table2. Percentage of type of antihypertensive drug was used.

Drug	Percentage
ACEI	69.6percent
B-blocker	26.07percent
Diuretic	23.76percent
CCB	20.79percent
ARB	3.31percent
Alpha-blocker	2.97percent

For lipid profile, mean total cholesterol, triglycerides, LDL-c and HDL-c level were 187.34 ± 39.77 mg/dL,170.05 ± 77-72 mg/dL,104.84 ± 33.53 mg/dL and 45.42 ± 12.17 mg/dL, respectively.

Achievement to the ADA guideline for cholesterol (TC<200 mg/dl) triglyceride (TG < 150mg/dl), LDL-c (< 100 mg/dl) and HDL-c (>50 mg/dl in female, > 40 mg/dl in male) were 43.2 percent, 31 percent, 29 percent (7.9 percent if LDL <70) and 60.28 percentmale and 33.65 percent in female patients, respectively. (Fig.3)

About half of patients (56.8 percent) received lipid lowering agent. The most common used lipid lowering agent was Simvastatin at 44.3 percent follow by Fibrate group, Atrovastatin and Rosuvastatin, respectively. Almost of patient used single lipid lowering agent only 4.58 percent used combined drugs. (Table.3)

Table 3: Type of lipid lowering agent and management.

Lipid control	Percentage
Diet control	43.2 percent
Simvastatin	44.3 percent
Gemfibrozil	2.3 percent
Atrovastatin	1.6 percent
Rosuvastatin	1.3 percent

Fundoscopic and Foot examination

Fundoscopic examination was performed in 33.7 percent of the patients and result of examination was showed that 55.8 percent of the patients had normal eye examination and 8.8 percent and 3.9 percent of patients has PDR and NPDR, respectively

Foot examination was performed in 50.8 percent of the patient and result of examination was showed in table.4

Table.4 Result of foot examination.

Result	Percentage
Normal	27.3 percent
Decreased arterial pulse	55.7 percent
Abnormal monofilament	35.4 percent
Heal foot ulcer	7.6 percent
Abnormal joint position	3.7 percent
Amputation	0.6 percent

Comorbidity

Hypertension is the most common comorbidity 67.7 percent follow by dyslipidemia 45.4 percent and obesity 18.8 percent. The prevalence of comorbidity illustrated in table.5

Table.5 The prevalence of co-morbidity of diabetic patient.

Co-morbidity	Percentage
Hypertension	67.7 percent
Dyslipidemia	45.4 percent
Obesity	18.8 percent
OA knee	4.0 percent
Gout	1.6 percent
OPD	0.4 percent
No comorbidity	13.9 percent

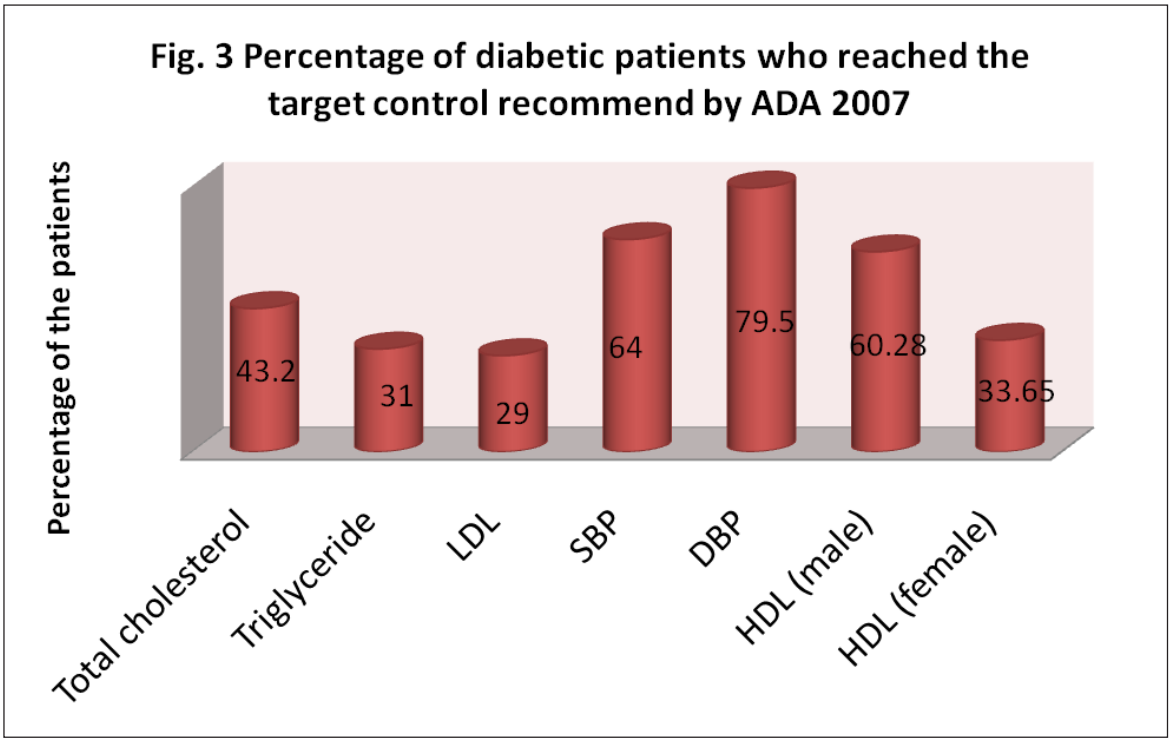
DM control/Drug/education

For diabetes control, majority of patients (76.5 percent) took oral hypoglycemic agents, only 5 percent of patient used diet control, 6.6 percent and 11.9 percent needed insulin therapy and combined insulin with oral hypoglycemic agent respectively. (Table.6)

Table.6 Combined insulin with oral hypoglycemic agent respectively

Diabetic control	Percentage
Oral hypoglycemic agent	76.5 percent
- single agent	24.1 percent
- two agent	48.5 percent
- three agent	3.6 percent
- more than 3 agent	0.3 percent
Insulin	6.6 percent
Insulin + OHA	11.9 percent
Diet control	5.0 percent

There were four types of oral hypoglycemic agents prescribed, including metformin (84.7 percent), sulphonylurea (79.1 percent), non sulphonylurea insulin secretagoue (1.5percent) and thiazolidinediones (6.7 percent). About half of patients (48.5 percent) used combine two oral hypoglycemic agents, 24 percent of patients used single oral hypoglycemic agent and only 3.9 percent of patients used more than three oral hypoglycemic agents.



About 2/3 of patients received education from practitioner and provider team including diet (50.9 percent), exercise (17.3 percent), foot exam (76.7 percent), SBGM (0.5 percent).

Complication

For acute complication, the incidence of dysglycemic complication was 27 times from 21 patients including DKA 2 times, hyperglycemia 17 times and hypoglycemia 8 times. 74 percent of these events required hospital admission.

For late complication, the prevalence of microvascular complication was illustrated in Figure. 4

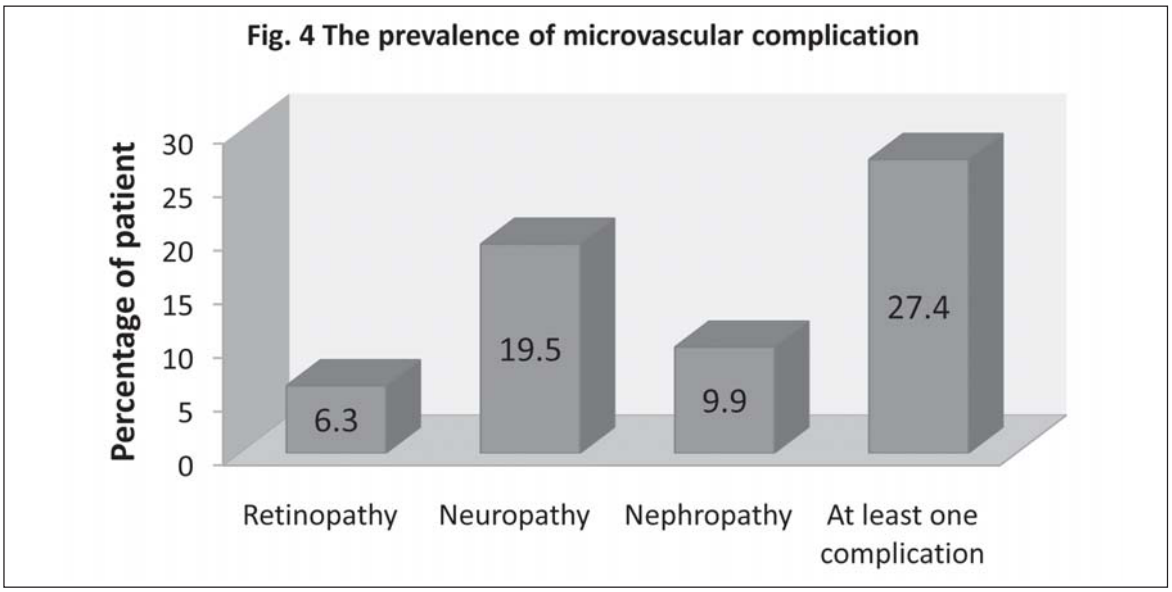
Overall 27.4 percent of patients have at least one microvascular complication.

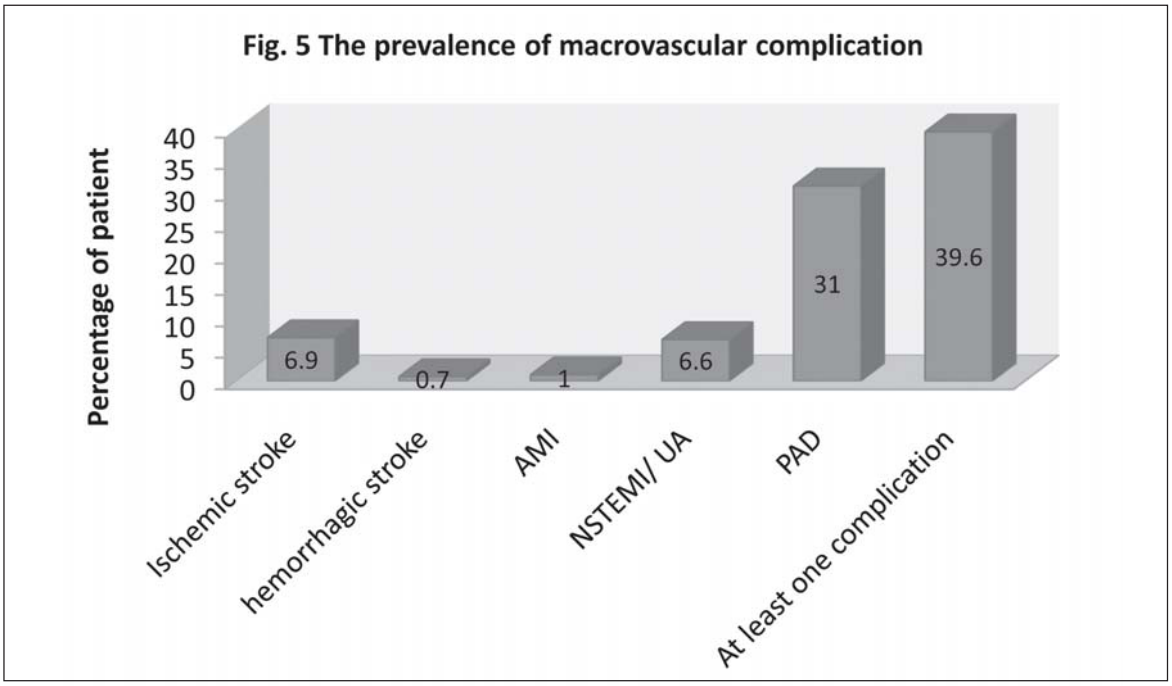
The prevalence of macrovascular complication was illustrated in Figure.5

Over all 39.6 percent of patients at least have one macrovascular complication.

Discussion

The present study described the status of diabetic care and complication among diabetic patients managed in out patient unit of Propoklao hospital during the year 2007. The proportion of patients with type 2 DM was more than previous study.[1] This demographic data was predominant with female patients, advance mean age, higher mean BMI and late of onset like previous reports.[1,2] However, the patients in this present report had shorter duration of diabetic duration when compare with





Thailand Diabetes Registry Project (TDR project). 15 Current smoking status in this study was lower than other studies.[2,15-17] The prevalence of obesity patients in this study was higher than TDR project (52.8 percent vs 39.2 percent)

The monitoring of glycemic control was base on measurement of FBS and HbA1C. In this study , HbA1C was monitored biannually in 40percent that was less than the study conducted at Maharat Ratchasima Hospital[2] where HbA1C was monitored biannually more than 90 percent.

The determination of serum lipid was monitored annually in 76.3 percent. In others studies, these assessments were much

higher. Thanya Chetthakul reported almost diabetes patients in Maharat Ratchasima Hospital had annually check up for lipid profile. In US, Jinan B. Saaddine reported significantly increased in lipid assessment from 76.3 percent in 1990s to 84.6 percent in 2000s.[16,17]

Annual fundoscopic examination in this study was also less than in others reports.[2,16-18] 70 percent of patients in Maharat Ratchasima Hospital, 67.7 percent of patients in US and 52.3 percent of patients in Sweden had annual fundoscopic examination.[18]

Foot examination was performed only 54 percent of patients in this study, had annual foot which was similar to the study in Sweden.[18]

The most frequent assessment was serum creatinine in 78.9 percent of the patient whereas, annual urine microalbumin checks up was done only 5 percent. The reason for suboptimal assessment should be analyzed for the better outcome in the future.

Achievement of glycemic control and metabolic derangement was another important issue in this study. The authors found that achievement for HbA1C (HbA1C < 7percent) in this study was better than other studies[2,15]; 31.7percent in TDR project, 38 percent in Maharat Ratchasima Hospital. However, achievement for LDL control (LDL < 100 mg/dl) in this study was less than previous studies;[2,15-17] 30.3 percent in Maharat Ratchasima Hospital, 36.7 percent in TDR project and 33.8 percent in US.

In this study, 75 percent of patients had good blood pressure control especially DBP which reach the target in 79 percent.

This result was significant better than other reports.[2,16-17] In Maharat Ratchasima Hospital, Only 40.2 percent of patients had good SBP control and 36.8 percent had good DBP control. Whereas in US, Jinan B Saaddine reported 48.4 percent of patients had good SBP control and 73.8 percent had good DBP control. In study conducted in primary setting in US 19, Stephen J Spann reported 35.5 percent of patients had good control both SBP and DBP. It can be explained by systolic hypertension was found more than diastolic hypertension in older age patients.

The higher prevalence of macrovascular complication may be due to diagnosis criteria of PAD. In this study, decreased arterial pulse was included in PAD group. So that, decreased arterial pulse was the most macrovascular complication in this study.

Microvascular complication is lower than the previous report, only 6.3 percent had retinopathy, 9.9 percent had nephropathy and 19.5 percent had neuropathy. Neuropathy was the most common microvascular complication in this study. It was

different from other studies.[2,15] At Maharat Ratchasima Hospital, retinopathy was the mast common that was reported 24.5 percent where as neuropathy was reported 16.8 percent. In TDR project, nephropathy was the most common microvascular complication that was reported 43.5 percent. In study conducted in primary care setting, Wannee Nittiyanant reported 13.6 percent of patients had diabetic retinopathy and 34 percent of patients had neuropathy that was the most common complication found in her study.[20] Stephen J. Spann reported 18.5 percent of patients in US had neurapathy and only 9.9 percent had retinopathy.[19]

Conclusion

Quality of care for diabetes patients in Prapoklo Hospital was fair. Only 40% of patients had good HbA1c and less than 50% of patients achieved metabolic control. Annual checkup for metabolic derangements was done in 50 - 60 % of patient. Screening for diabetes nephropathy might be more serious because only 5% of patients had tested for microalbuminuria. Because of this reason, local diabetic care system or care map should be implemented for early identification and prevention complication in the future

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