DIABETICS ON DIALYSIS IN THE REPUBLIC OF MACEDONIA: A NATIONWIDE EPIDEMIOLOGICAL STUDY

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A b s t r a c t: *Background*: Incidence increase of diabetes mellitus (DM) has taken epidemic proportions in the world. Diabetic nephropathy (DN) is a most serious complication, taking a leading place as a factor in the progression of chronic kidney disease (CKD). Dialysis treatment of these patients is complex, expensive, and exerts an excessive burden on the health budgets of the affected countries.

Methods: We performed a nationwide precise observational study with the aim of analysing diabetics on dialysis in dialysis centres throughout the Republic of Macedonia (RM) in 2002 and in 2006; to compare the results from patients records; and to gather data on the epidemiology, clinical characteristics and complications of diabetes type 1 (DM1) and diabetes type 2 (DM2).

Results: The prevalence of HD patients in RM was 1114 vs 1074 in 2002 and 2006, respectively. Of these, 109 (9.78%) vs. 115 (10.71%) had DM in 2002 and 2006, respectively. The percentage of diabetics on dialysis between different centers varied between 3% to 21% vs. 2.4% to 22.07% in 2002 and 2006, respectively. The mean age of the patients was 58 ± 10.29 vs. 56.5 ± 10.71 in 2002 and 2006, respectively. Patients with DM1 were 19 (17.43%) vs. 15 (13.04%) and with DM2 were 90 (82.57%) vs. 100

(86.96%) in 2002 and 2006, respectively. 28 (25.68%) vs. 31 (26.96%) patients were on oral anti-diabetic drugs and 62 (57.21%) vs. 69 (60%) patients were on insulin in 2002 and 2006, respectively. Mean age of DM1 patients was 47 ± 11.6 y. vs. 45 ± 7.32 y. respectively and of DM2 was 60.37 ± 8.33 y. vs. 61.14 ± 10.23 y., in 2002 and 2006, respectively. Mean time of insulin treatment was 9.5 ± 6.63 y. vs. 10.85 ± 9.29 y. in 2002 and 2006. Mean Body Mass Index (BMI) was 26.4 vs. 23.49 ± 4.74 kg/m^2 in DM1 and 25.5 vs. 24.77 ± 3.70 kg/m^2 in DM2 patients in 2002 and 2006, respectively. Thrombosis of first arteriovenous fistulae (AVF) occurred in 41% vs. 25.22% in 2002 and 2006, respecttitvely. Hepatitis C virus (HCV) infection was confirmed in 57% vs. 44% of DM patients in 2002 and 2006, respectively. Most common co-morbidity in patients was hypertension, 91% vs. 80.87% in 2002 and 2006, respectively.

Conclusion: The number of diabetics on dialysis in the Republic of Macedonia did not increase in the period from 2002 to 2006. In DM2 diabetics on dialysis the frequency of complications is higher and time on dialysis is shorter than in DM1 patients. Early detection of diabetic nephropathy by primary care physicians as well as collaborative treatment by diabetologists, nephrologists, cardiologists and ophthalmologists before and during dialysis are important for improvement of treatment and survival of diabetic patients on dialysis.

Key words: diabetes mellitus, diabetic nephropathy, hypertension, end-stage renal disease, hemodialysis.

Introduction

Diabetes Mellitus is a common disease, affecting between 4 and 8% of the general population of industrialized countries [1, 2]. Finding a higher frequency of advanced stage of chronic kidney disease (CKD) in patients with DM type 2 (DM2) was recently named as a "A medical catastrophe of worldwide dimension" [3]. In the United States almost 45% of dialysis patients are diabetics and DM2 is the major cause of the increased incidence and prevalence of CKD. It is alarming data that the number of diabetic patients on dialysis is increasing at a rate of 9% every year [4]. In Northern Europe, diabetic nephropathy constitutes one of the most frequent causes of end-stage CKD patients [5]. It has been shown recently that the increased presence of diabetics on dialysis was composed more frequently of DM2 patients, probably as a consequence of the ageing of population as well as of a reduction in the frequency of fatal cardiovascular events [3]. The clinical outcomes of these patients, although improved in recent years, are still worst than those of non-diabetic dialysis patients [6]. The most common complications of diabetes are cardiovascular events (CVE) and it is important to underline that the risk of CVE increased several-fold, and proportionally with the death risk [7]. Other common complications more frequent in these patients, shown by others and us, are malnutrition and sepsis [8–10]. Consequently, mortality in diabetic dialysis patients is 1.5 to 2.5 times higher as

compared to non-diabetic patients, and a 5-year survival of these patients on dialysis is less than 20%. Furthermore, the higher mortality rate in these patients is explained as a result of CV complications in the pre-terminal phase of CKD [11].

Today nephrologists are challenged both to control the underlying diabetic disease and also to provide adequate renal replacement therapy. On the other hand, it has to be stressed that treatment of these patients and DM complications is very expensive. For example, in USA the cost of treatment per year was estimated to about 100 billion dollars, which is more than the whole health budget of a country like Italy (health budget estimated for 2001). Moreover, in USA around 2 billion dollars are being spent on dialysis treatments [6]. Recently performed large epidemiological studies have demonstrated that CV morbidity and all causes of mortality can be reduced with strict glycaemic and blood pressure control and with the use of anti-angiotensine agents and also lipid lowering agents [12–16]. Certain factors such as age, time on dialysis, vascular access complications, co morbidities, type of dialysis membrane, time of dialysis, etc. have been identified as correlating with the survival of patients on dialysis [17, 18]. These factors assume even greater importance in diabetics. Biocompatible membranes, ultrapure dialysis fluid and diffuse – convective techniques have also been promoted to reduce cardiovascular instability [19, 20] and to minimize injuries from the excessive oxidative stress inherent in uraemia and dialysis treatment.

In the Republic of Macedonia (RM) in the last two decades there was an increase in the number of diabetic patients. The number of patients with diabetic nephropathy progressing to the point of need for renal replacement therapy and renal transplantation is also increasing [21–23]. Given the fact of lack of data and valuable epidemiological studies in these patients, we performed a nation-wide study with the aim of defining the prevalence of these patients in RM, determining the standards of care in diabetics in term of methodological approach, dialysis and drug treatment and analysis of these patients on dialysis. The aim of the study was to make a closer observation of all dialysis centres in 2002 in the country and to compare data with those obtained in 2006.

Patients and methods

Data were collected from medical histories of diabetic patients on dialysis in all the dialysis centres in the Republic of Macedonia by using a questionnaire specially developed for this purpose. The date of 31 December for years 2002 and 2006 was selected as a "critical day" for data collection. Besides demographic data (name, surname, sex, date of birth and profession), data on ciga-

rette smoking and alcohol consumption were collected as well as type of diabetes (family history of diabetes, therapy, dose and type of insulin intake, duration of diabetes and kidney disease), hypertension (family history, duration, therapy), other renal diseases including diabetic nephropathy, as well as laboratory findings: residual diuresis, blood glucose level, HbA1C, microalbuminuria, proteinuria, urea, creatinin blood level, creatinin clearance, tryglycerides (TG) blood level, cholesterol, HDL and LDL cholesterol, hepatitis B virus serological markers (HBs Ag, anti HBc-Ig G), hepatitis C virus serological markers (anti HCV) and human immunodeficiency virus antibodies (anti-HIV); type of dialysis (bicarbonate or acetate); duration and frequency of dialysis sessions, medications used, hypoglycaemic events, number of hospitalizations, complications: cardiovascular events (pectoral angina, heart attack, cerebrovascular insult), hypertension, peripherial vascular artheriopathy (diabetic foot), diabetic retinopathy, infection of the urinary system); cause of death – if patient died. The progression of other diabetic complications was obtained by roentgenograms, ECG, echocardiography and examination of eye fundus. Special attention was paid to data on vascular access (type of central venous catheter, A-V fistula, graft, complications on vascular accesses infection/thrombosis, other complications, as well as number of created vascular accesses).

Patients were treated according to the recommendations introduced by the University Nephrology Clinic – Skopje, Faculty of Medicine, Ss. Cyril and Methodius University in Skopje, as a reference centre for dialysis patients in the Republic of Macedonia [9]. The duration of dialysis sessions was approximately three times four hours per week, divided into three day sessions in the same week. Low flux polysulphonic membranes were used. Water was prepared by a reverse osmosis and blood flow in most cases was 250–280ml/min, whereas dialysis flow was usually 500 ml/min. The dialysis machines used were GAMBRO types AK 10, AK 100 and AK 95. There was no reuse of dialysis filters. A low salt intake diet and malnutrition protective protein intake of 1gr/kg diet were recommended to all patients.

Results

The total number of dialysis patients in RM was 1114 and 1074 in 2002 and 2006, respectively (Figure 1, Table 1). There were 109 (9.78%) diabetic patients on dialysis, 60 (55%) male and 49 (45%) female in 2002. A slight incre ase in diabetics was determined in 2006, namely there were 115 (10.7%) diabetic patients on dialysis, 74 (64.35 %) male and 41 (35.65%) female in 2006, as compared with 2000, when the total number of dialysis patients was 1010 and the number of diabetics on dialysis was 103 (10.19%) [21, 22] (Figure 2). There was a difference in the distribution of diabetics on dialysis at different dialysis
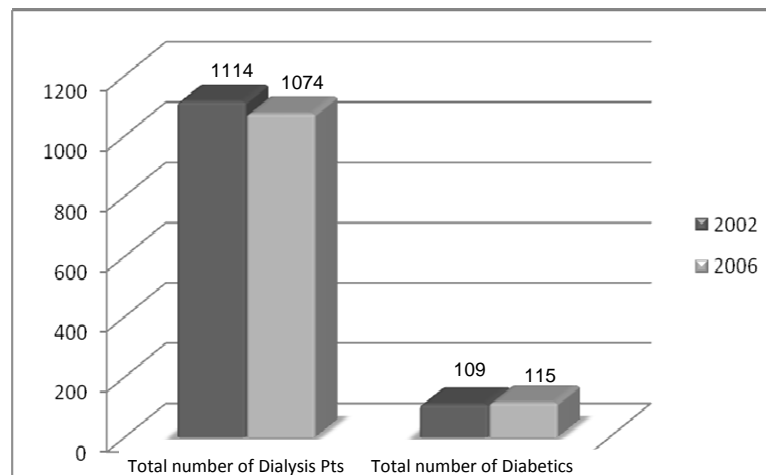
Figure 1 – Total number of patients on dialysis and diabetics on dialysis
Слика 1 – Вкупен број на пациенти на дијализа и дијабетичари на дијализа

centres in RM for 2002 and 2006 (Table 2 and Table 3), respectively. Diabetics on dialysis were from 3% in Veles to 21% in Kavadarci in 2002. A similar diversity was obtained in 2006: from 2.43% in Skopje Military Hospital Dialysis Centre to 22.07% in the University Nephrology Clinic – Skopje. In 2002 most of the diabetics on dialysis (31 patients) were registered in the University Nephrology Clinic – Skopje and in the Nephrology Institute – Struga (15 patients) similarly to 2006, when most of the diabetics on dialysis (34 patients) were in the University Nephrology Clinic – Skopje and in Nephrology Institute – Struga (16 patients). The mean age of all diabetics on dialysis in 2002 was 58±10.29 years (56 ± 10.49 for males and 60 ± 9.56 for females), and in all diabetics on dialysis in 2006 it was 56.5 ± 10.71 years (55.06 ± 8.82 for males and 57.92 ± 12.56 for females) (Table 1). In 2002, 19 (17.43%) patients had DM1, while 90 (82.57%) patients had DM2. 28 (25.68%) patients were treated with oral anti-diabetic drugs and 62 (57.21%) patients were on insulin. In 2006, 15 (13.04%) patients had DM1 while 100 (86.96%) patients had DM2. 31 (26.96%) of the diabetics were treated with oral anti-diabetic drugs and 69 (60%) were on insulin. The mean age of DM1 patients in 2002 was 47 ± 11.6 years, with a diabetic history of 16.2 ± 9.7 years, while the mean age of DM1 patients in 2006 was 45 ± 7.32 years, with a diabetic history of 24.07 ± 11.07 years. The mean age of DM2 patients in 2002 was 60.37 ± 8.33 with a diabetic history of 13.4 ± 8.1 years and the mean age of DM2 patients in 2006 was 61.14 ± 10.23 years

Table 1 – Табела 1

Characteristics of diabetics on dialysis in the Republic of Macedonia
Карактеристики на дијабетичари на дијализа во Република Македонија

	2002 year	**2006 year**
N° dialysis patients	1114	1074
N° of diabetics	109 (9.78%)	115 (10.7%)
Male Pts	60 (55%)	74 (64.35%)
Female Pts	49 (45%)	41 (35.65%)
Mean age	58 ± 10.29	56.5 ± 10.71
Mean age male	56 ± 10.49	55.06 ± 8.82
Mean age female	60 ± 9.56	57.92 ± 12.56
Patients with DM1	19 (17.43%)	15 (13.04%)
Mean age DM1	47 ± 11.6	45 ± 7.32
DM history DM1 (years)	16.2 ± 9.7	24.07 ± 11.7
DM1 dialysis history (months)	54.3 ± 44.4	76.29 ± 74.96
Patients with DM2	90 (82.57%)	100 (86.96%)
Mean age DM2	60.4 ± 8.33	61.14 ± 10.23
DM history DM2 (years)	13.4 ± 8.1	14.18 ± 8.42
DM2 dialysis history (months)	34.3 ± 36.3	33.68 ± 43.24
On OADD	28 (25.68%)	31 (26.96%)
On insulin	62 (57.21%)	69 (60%)
Dose of insulin (IU)	9.5 ± 6.63	10.85 ± 9.29
BMI in DM1 kg/m^2	26.4	25.5
BMI in DM2 kg/m^2	23.49 ± 4.74	24.77 ± 3.70
First dialysis on FVC (%)	90.1	94.4
Preventive AVF (%)	9.9	5.6
Thrombosis of first AVF (%)	41	24.35
Anti HCV positive (%)	57	37.39

DM1 – Diabetes mellitus type 1, DM2 – Diabetes mellitus type 2; OADD – Oral antidiabetic drugs; BMI – Body mass index; FVC – femoral vascular cathether; AVF – Arterio venouse fistula; HCV – Hepatitis C Virus

with a diabetic history of 14.18 ± 8.42 (Table 1). The mean dose of insulin intake was 9.5 ± 6.63IU and 10.85 ± 9.29IU, for 2002 and 2006 respectively. In

2002, 21% of diabetics on dialysis were smokers, 13% consumed alcohol, while 15% were engaged in sport, as compared to 2006 when 17.39% of diabetics on dialysis were smokers, 5.22% consumed alcohol and 3.48% were engaged in sport.
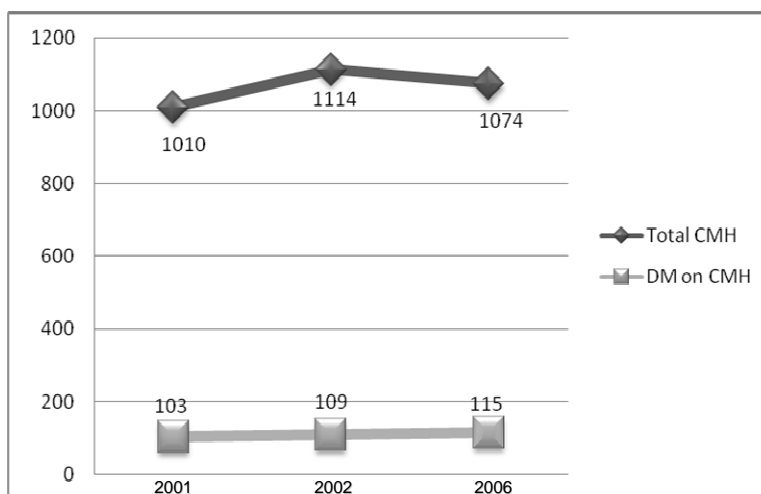

Figure 2 – Oscillations in the total number of dialysis patients and diabetics on dialysis, period 2001–2006 in RM
Слика 2 – Осцилации на вкуйниот број на дијализни йациенти и дијабетичари на дијализа во йериодот 2001–2006 во РМ

The mean duration of dialysis therapy in 2002 for DM type 1 patients was 54.3 ± 44.4 months, whereas in DM type 2 it was 34.3 ± 36.3 months. The mean duration of dialysis therapy in 2006 for DM 1 patients was 76.29 ± 74.96 months, whereas in DM 2 it was 33.68 ± 43.24. The mean body mass index (BMI) in 2002 was 26.4 ± 3.28 kg/m^2 and 25.5 ± 2.92 kg/m^2 in DM1 and DM2 patients, respectively. In 2006, BMI was 23.49 ± 4.74 kg/m^2 and 24.77 ± 3.70 kg/m^2 in DM1 and DM2 patients, respectively. There was a need for urgent dialysis treatment and a first dialysis session through a femoral venous catheter in 90.1% and 94.4% of diabetics on dialysis in 2002 and 2006, respectively. After a period of patient adaptation to dialysis procedure and in order to eliminate possible bacterial infection through the femoral venous catheter, an arterio venous fistula (AVF) was created as a permanent vascular access for dialysis. Preventive AVF was created in 9.9% and in 5.6% of diabetics on dialysis in 2002 and 2006, respectively. Thrombosis in the newly created AVF was detected in 41% and 24.35% in 2002 and 2006, respectively, whereas AVF infection was detected in 58.6% of the patients in 2002. In 2002 there were 19.26%

patients on acetate dialysis and 80.74% on bicarbonate dialysis while in 2006 there were no patients on acetate dialysis, and all 110 diabetic patients (95.65%) were on bicarbonate dialysis modality (Figure 3).

Table 2 – Табела 2

Distribution of dialysis patients by dialysis centres in RM, 2002
Дистрибуција на дијализни пациенти по дијализни центри во РМ, 2002 година

Dialysis centre	N° of Dialysis pts	N° of Diabetics	% DM
University Nephrology Clinic, Skopje	201	31	15.42
Nephrology Institute, Struga	204	15	7.35
Tetovo	63	9	14.28
Gevgelija	28	1	3.57
Debar	15	2	13.30
Gostivar	53	4	7.54
Kočani	24	3	12.50
Kumanovo	60	6	10.00
Delčevo	31	4	12.90
Strumica	46	4	8.69
Prilep	60	6	10.00
Bitola	38	4	10.52
Štip	49	3	12.50
Železara	125	5	4.00
Military hospital, Skopje	40	3	7.5
Veles	39	1	2.56
Kavadarci	38	8	21.50
Total	**1114**	**109**	**9.78**

It has to be stressed that a high rate of HCV infection was noticed in diabetics on dialysis. 57% and 37.39% of these patients were anti HCV positive in 2002 and in 2006, respectively. 81% and 86.09% of the patients were treated with erytropoethin in 2002 and 2006, respectively. In both years, hypertension (HTA) was the most frequent co-morbid state: in 2002, 91% diabetics on dialysis had HTA before the dialysis programme and following the start of dialysis

Table 3 – Табела 3

Distribution of dialysis patients by dialysis centres in RM, 2006
Дисшрибуција на дијализни йациенши йо дијализни ценшри во РМ, 2006

| Dialysis center	N° of Dialysis pts	N° of Diabetics	% DM
University Nephrology Clinic, Skopje	171	32	19.88
Nephrology Institute, Struga	171	16	9.36
Tetovo	69	11	15.94
Gevgelija	30	2	6.67
Kriva Palanka	26	3	11.54
Gostivar	46	4	8.70
Kočani	31	1	3.23
Kumanovo	49	7	14.29
Delčevo	32	7	21.88
Strumica	47	3	6.38
Prilep	56	6	10.71
Bitola	43	2	4.65
Štip	60	4	6.67
Železara	162	12	7,1
Military hospital	40	2	5
Veles	41	1	2.44
Total	**1074**	**115**	**10.71**
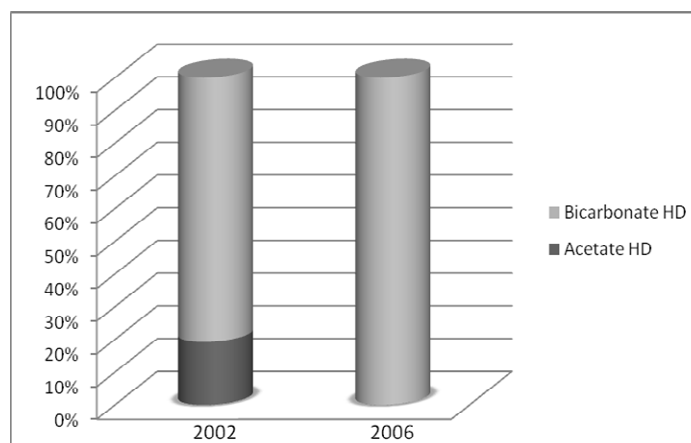
Figure 3 – Use of acetate and bicarbonate haemodialysis (HD) in 2002 and 2006
Слика 3 – Уйошреба на ацешашна и бикарбонашна хемодијализа во 2002 и 2006

sessions, 40.54% (Table 4). Furthermore, in 2006 HTA was registered in 47.74% of diabetics before dialysis, and in 60% of patients during dialysis. Finally, a family history for HTA was noticed in 43% and 29.57% of the patients in 2002 and 2006 respectively. The most frequent cardiovascular co-morbidity in these patients for the years 2002 and 2006 are shown in Table 4.

Table 4 – Табела 4

*Distribution of the most frequent cardiovascular co-morbidity in diabetics
on dialysis in 2002 and 2006*
*Дистрибуција на најчестите кардиоваскуларни компликации кај дијабетичари
на дијализа во 2002 и 2006*

Condition	Before Dialysis (2002)	During Dialysis (2002)	Before Dialysis (2006)	During Dialysis (2006)
Pectoral angina	7.2%	19%	1.12%	3.4%
Heart attack	5.4%	5.4%	1.12%	4.43%
Intermitent claudication	10%	10%	2.25%	11.3%
Cerebrovascular attack	7%	8%	8.7%	9.57%
Hypertension (HTA)	91%	40.54%	47.74%	60%

Discussion

In the present analysis we have demonstrated an increase in the prevalence on diabetic dialysis patients in certain dialysis centres in the Republic of Macedonia (RM). It has been reported before that the annual incidence of patients who initiate dialysis is constantly increasing in all industrialized countries and a significant part of this increase is explained by the influx of diabetic patients on dialysis [1, 2]. This study shows the importance of the need to increase the number of specialist nephrologists in RM who will play an important role in the healthcare of these patients in collaboration with endocrinologists and other specialist practitioners.

We have previously shown that the number of diabetics on dialysis in RM is increasing slowly but progresively [21–24]. In the current analysis, besides the fact that the mean total prevalence of DM was only slightly increased as compared to our previous studies [22], we show that there is an important difference in the prevalence of diabetics on dialysis among different dialysis centres. In certain centres of dialysis in RM the prevalence of diabetics reached a level similar to that of Northern European countries [25] while in others it was

lower than expected. This diversity in the number of diabetics on dialysis could be explained by the fact that RM is a developing country, geographically European with a predominantly mediterranean diet, and it difference could be due to numerous economic, sociological, genetic, environmental and nutritional factors in different parts of the country.

We included in the study all diabetic patients on dialysis in RM, without differentiating diabetics who started dialysis because of diabetic nephropathy from those who started dialysis with another renal pathology. We show that diabetics with CKD were in most cases diagnosed at the University Nephrology Clinic – Skopje, and diagnosis was most often in a developed phase of CKD. It has been shown that these patients present an extraordinary acceleration of all clinical complications and it is a well-known fact that accelerated development of terminal uraemia constitutes a devastating clinical event [3, 6, 26, 27]. The phase of the disease when diabetes is installed is usually accompanied by a certain variety of cardiovascular complications, predominantly as a result of long-term hypertension, nephrotic syndrome and infections. Metabolic and blood vessel modifications induce constant overweight and problems with vascular access leading to a decrease in quality of life in these patents. Consequently, as has been shown by others and by us, the survival rate of diabetics on dialysis is significantly reduced, Figure 4 [28, 29]. When compared with other dialisys patients it has been shown that the best survival rate was observed in those with balkan endemic nephropathy and adult polycystic kidney disease. This observation is in line with other studies confirming that in diabetics on dialysis the quality of life is impaired and survival is significantly curtailed [3, 7, 26]. It has also been shown that the clinical results depend on both the severity of complications present at the initiation of dialysis and on the capacity to slow its evolution during dialysis [30]. In current analysis we did not evaluate the effect of patient therapies on the incidence of complications and patient mortality.

Besides the fact that most of the nephrologists and internal medicine specialists in RM are aware of the importance of the timely initiation of dialysis for diabetic patients, this analysis underlines the fact that dialysis initiation often starts in emergency conditions and most of the patients start a dialysis programme at the University Nephrology Clinic – Skopje through an urgently and temporarily placed femoral venous catheter. We found that almost 90% of first dialysis sessions in 2002 as well as in 2006 were started in emergency conditions, confirming that diabetics are referred to the nephrologists late in the course of CKD. Analysing why this happens, we think that a part of the responsibility for the delay in dialysis initiation could be explained by patient mentality but it is also important to stress the important role of medical perosnnel in preparing the patient for dialysis. We have to underline insufficient coordination between physicians such as general practitioners, internists, endocrinologists and
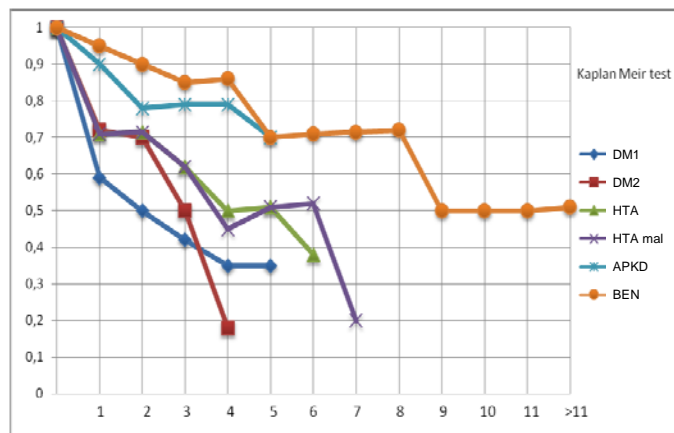
Figure 4 – Distribution of survival (Kaplan Meier test) of dialysis patients, distribution by basic renal disease (University Nephrology Clinic – Skopje); abbrevations: Diabetes Mellitus Insulin Independent – DM2, Diabetes Mellitus Insulin Dependent – DM1, Arterial Hypertension – HTA, Malignant HTA – HTA mal., Adult Polycystic Renal Diseases – APKD, Balkan Endemic Nephropathy – BEN)

Слика 4 – Крива на преживување (Kaplan Meier тест) на пациенти на дијализа, во зависност од основната болест (Клиника за нефрологија, Скопје); кратенки: Инсулин независен диабетес мелитус – ДМ2, Инсулин зависен диабетес мелитус – ДМ1, Артериска хипертензија – ХТА, Малигна ХТА – ХТА мал., Адултна поли-цистична бубрежна болест – АПББ, Балканска ендемска нефропатија – БЕН)

nephrologists, and the lack of their influence on patient dialysis reality acceptance. It is also important to note that in two dialysis centtes where the prevalence in diabetics on dialysis is much higher, dialysis patients are followed by educated and well-trained nephrologists. In these centres accessibility of other specialists practitioners is higher as compared to dialysis centres where patients are followed by internal medicine specialists and other specialised doctors are also less accessible. This might explain the high difference in the number of diabetics among different dialysis centres and it also underlines the need for more trained nephrologists in the country and their more important implication in the follow-up of diabetics on dialysis.

It has been shown previously that a very large difference exists in the ratio of DM2 to DM1 on dialyisis in different European countries and among different regions in a same country [3]. A recent study of the Italian population showed that most diabetics on dialysis were DM2 patients, probably because of the high prevalence of this disease among the general population [31]. In our study we found that the ratio of DM2 to DM1 patients was approximately 4.3 : 1. As expected, patients with DM2 were older, with a higher body weight and

body mass index. Epidemiological studies have also shown that cardiovascular morbidity and mortality can be reduced with pharmacological therapy that normalises blood pressure values and controls hyperglicaemia, hyperlipidaemia, platelet agreggation and hypercoagulability [12–14]. The proportion of diabetics on dialysis treated with ACE inhibitors and/or angiotensin receptor blockers (ARB), beta blockers and antiplatelat drugs was still quite low as compared to the propositions of the guidelines. There was a negligible number of patients treated with lipid lowering agents.

In conclusion, the present study underlines the importance of an interdisciplinary approach in the early diagnosis and treatment of diabetes, diabetic nephropathy and the treatment of diabetics on dialysis, as well as the importance of introducing preventive measures against the progression of CKD in these patients. In most dialysis centres in the Republic of Macedonia the prevalence of diabetics on dialysis did not increase in the period from 2002 to 2006 where these patients were followed mostly by internal medicine specialists. Frequency of complications was increased in DM2 compared to DM1 dialysis patients. Blood glucose level control is important as well as strict control of the blood pressure. Bicarbonate dialysis is a dialysis of choice with an optimal duration of a minimun of 12 hours per week. More nephrologists need to be involved in the dialysis centres together with an improvement in collaboration between general practitioners, interntternal medicine doctors, endocrinologists, nephrologists, cardiologists, ophtalmologists and neurologists in order to improve health care for these patients. This kind of study should be carried out on a regular basis in the Republic of Macedonia.

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Р е з и м е

ПАЦИЕНТИ СО ДИЈАБЕТЕС МЕЛИТУС НА ДИЈАЛИЗА ВО РЕПУБЛИКА МАКЕДОНИЈА: НАЦИОНАЛНА КОМПАРАТИВНА ЕПИДЕМИОЛОШКА СТУДИЈА

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Вовед: Последните години инциденцијата на дијабетес мелитус (ДМ) во светот добива епидемиолошки димензии. Една од најсериозните компликации на ДМ е дијабетичната нефропатија (ДН) која зазема водечко место како причинител за прогресијата на хроничната бубрежна болест (ХББ). Познато е дека третманот на овие пациенти е комплексен и скап, истовремено претставувајќи огромно преоптоварување на здравствените фондови.

Методи: Изведовме национална опсервациона студија со цел да се анализираат пациентите со ДМ на дијализа во дијализните центри во 2002 и во 2006 г. во Република Македонија (РМ) и да се споредат резултатите од документите на пациентите како и да се добијат епидемиолошки, клинички и податоци за компликациите кај пациенти со тип 1 (ДМ1) и тип 2 (ДМ2) дијабетес.

Резултати: Преваленцијата на пациенти на дијализа во РМ беше 1.114 наспроти 1074, за 2002 односно 2006 година, соодветно. Од овие пациенти, 109 (9,78%) vs. 115 (10.71%) имале ДМ во 2002 vs 2006, соодветно. Процентот на дијабетичари на дијализа помеѓу различни центри за дијализа беше со различност од 3 до 21% наспроти 2,4% до 22,7% во 2002 наспроти 2006 година, соодветно. Средната возраст на пациентите беше 58 ± 10.29 години наспроти 56.5 ± 10.71 години во 2002 и 2006 година, соодветно. ДМ1 имале 19 (17.43%) vs 15 (13,04 %) и ДМ2 имале 90 (82,57%) vs 100 (86.96%) во 2002 и 2006, соодветно. 28 (25.68%) наспроти vs 31 (26,96%) пациенти биле на третман со орални антигликемични лекови, а 62 (57.21%) наспроти 69 (60%) на третман со инсулин во 2002 и 2006, соодветно. Средната возраст на пациенти со ДМ1 беше 47 ± 11.6 наспроти 45 ± 7.32 години во 2002 и 2006, година, соодветно. Средната возраст на пациентите со ДМ2 беше 60.37 ± 8.33 vs наспроти 61.14 ± 10.23 години за 2002 и 2006 година, соодветно. Средното времетраење на ХД терапија кај пациенти со ДМ1 беше 54.3

± 44.4 vs наспроти 76.29 ± 74.96 месеци, додека кај пациенти со ДМ2 беше 34.3 ± 36.3 vs наспроти 33.68 ± 43.24 за 2002 и 2006 година, соодветно. Тромбоза на артериовенска фистула (АВФ) се појави кај 41% vs наспроти 25.22% во 2002 и 2006, соодветно. Хепатитис Ц вирусна (HCV) инфекција беше позитивна кај 57% vs наспроти 44% од пациентите во 2002 наспроти 2006, соодветно. Хипертензијата е најчеста коморбидна состојба кај 91% во 2002 г. наспроти 80.87% во 2002 и 2006 година, соодветно.

Заклучок: Преваленцијата на дијабетичарите на дијализа не се зголемила во периодот од 2002 до 2006 година. Кај ДМ2 пациентите на дијализа, честотата на компликациите е зголемена додека дијализниот стаж е намален во споредба со пациентите со ДМ1. Раното откривање на дијабетичната нефропатија од страна на матичниот лекар како и колаборативниот пристап од страна на дијабетолози, нефролози, кардиолози и офталмолози пред и во текот на дијализата се многу значајни како за подобрување на третманот така и за преживување на овие пациенти.

Клучни зборови: дијабетес мелитус, дијабетична нефропатија, хипертензија, терминална бубрежна болест, хемодијализа.

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