THE ROLE OF DIABETIC RETINOPATHY IN BLINDNESS AND POOR SIGHT IN SPLIT-DALMATIA COUNTY 2000-2010

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SUMMARY – Diabetic retinopathy is the fifth leading cause of blindness in the world. The aim of this study was to determine the number of blind persons in the Split-Dalmatia County in the 2000-2010 period and how many of them are blind due to diabetic retinopathy. Records of 160 members of the Association of the Blind in the Split-Dalmatia County, enrolled from 2000 to 2010, were retrospectively analyzed. The leading causes of blindness were diabetic retinopathy (25.6%), glaucoma (13.1%), retinal dystrophy (16.2%), and age related macular degeneration (11.8%). The annual incidence of blindness was 8.4/100,000 inhabitants. The largest number of the blind were found in the 70-80 (21.2%) to >80 (24.3%) age group. Diabetic retinopathy was the cause of blindness in 24 (15%) men and 17 (10.6%) women. The annual incidence of diabetic retinopathy was 2.16 *per* 100,000. No case of blindness due to diabetic retinopathy was diagnosed in patients younger than 30 years of age, while the highest prevalence was found in the 70-80 age group (34%). Proliferative diabetic retinopathy was the cause of blindness in 92.7% and nonproliferative diabetic retinopathy in 7.3% of cases. Study results show that diabetic retinopathy remains the leading cause of blindness. Early identification of high-risk patients is the key factor in prevention and timely detection of ophthalmoscopic changes, thus enabling effective and duly treatment.

Key words: *Blindness; Diabetes – complications; Diabetic retinopathy; Incidence; Croatia – epidemiology; Split-Dalmatia County*

Introduction

The latest report of the World Health Organization confirms the thesis that a growing number of the blind is due to diseases associated with longer life expectancy, and to diabetes. Global estimates indicate that there are 37 million blind people and more than 161 million people with visual impairment. Cataract is the leading cause of blindness in the world with 47.8% of cases, while diabetic retinopathy accounting for 5% is the fifth leading cause[1]. The latest Croatian studies indicate that blind individuals account for 0.13% of the 4.5 million population of Croatia, i.e. 5800 people[2].

Diabetes mellitus is a complex multifactorial disease, chronic and life-long metabolic disorder with a tendency of constant growth. It is often associated with progressive retinopathy and vision loss[3]. Type 1 diabetes accounts for 5%-10% and type 2 diabetes for 90%-95% of all diagnosed cases[4]. Diabetes prevalence is 2% in Europe[5] and 6.1% in Croatia[6].

Diabetic retinopathy is the most common chronic complication of diabetes. In developed countries, it is the leading cause of new blindness cases in people aged 20-74, and the mean incidence of diabetic retinopathy in the U.S. and Europe is 40.3%. The incidence of blindness increases with the severity of retinopathy, age and diabetes duration; the relative risk of blind-

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ness in diabetic patients is 29 times higher[3]. Younger groups of insulin-dependent patients have the highest incidence, progression assessment and progression to proliferative diabetic retinopathy, while older groups of insulin-independent patients have the lowest progression assessment. Older groups of insulin-dependent patients have the highest incidence of developing diabetic macular edema[7].

The frequency of blindness cases caused by diabetes increases with age and reaches maximum in patients aged 65-74. After that age, the frequency decreases, probably due to diseases of other organs and an increased mortality of diabetic population. Estimates of the visual impairment prevalence in diabetic patients based on the population study are best displayed in the Wisconsin Epidemiologic Study of Diabetic Retinopathy[8]. No cases of blindness were found in people younger than 25. The prevalence of blindness increases with age in both men and women, reaching the peak of 20% in patients aged 65-74. In the older group, the prevalence of blindness increases with age by 2.2% in insulin-independent patients, and by 1.6% in insulin-dependent patients. In both population groups, the older and the younger one, blindness is associated with diabetes duration. In the younger group, blindness first appears in patients with diabetes of 15-year duration or more, rises by 3% in those with diabetes of 15- to 19-year duration, and by 12% in those with <30-year diabetes duration. Cases of blindness are less common in older diabetics and affect only 7% of patients who have had diabetes for 20 to 24 years.

Diabetic retinopathy is partly or completely responsible for legal blindness (visual acuity 0.1 or less) in 86% of young patients. It is, though, a less common cause of blindness in the elderly; other causes of visual impairment such as senile macular degeneration or cataract are more common in this group.

According to English reports, 2% of 499 insulin-independent and 1% of 212 insulin-dependent patients are legally blind[9], while Danish studies report that 3.4% of men and 2.6% of women in the group of 727 patients with type 1 diabetes, aged 30, are legally blind[10]. The incidence of blindness in Europe is 50-65 *per* 100,000 diabetic patients a year[11-14], while in Croatia, diabetic retinopathy causes blindness in 2.9% of diabetic patients[14,15].

Subjects and Methods

Records of 160 members of the Association of the Blind in the Split-Dalmatia County, enrolled from 2000 to 2010, were retrospectively analyzed. All subjects were blind[16]. The youngest subject was aged 8 and the oldest 92; there were 96 (60%) men and 64 (40%) women. Data on the Split-Dalmatia County population are based on 2001 census, which amounted to a total of 463,676 inhabitants[17]. The number of diabetic patients was 65,000, based on the data of the Split-Dalmatia County Diabetic Society.

Data were collected and stored using Excel 2007 software (Microsoft Corporation, USA) and presented as absolute values and percentages.

Results

One hundred and sixty blind people were registered during the period between 2000 and 2010. The leading causes were diabetic retinopathy (n=41, 25.6%), glaucoma (n=21, 13.1%), retinal dystrophy (n=26, 16.2%), and age related macular degeneration (n=19, 11.8%). The annual incidence was 8.4/100,000 inhabitants. The largest number of blind people were found in the 70-80 age group (n=34, 21.2%), followed by the >80 age group (n=39, 24.3%), whereas the lowest number of blind people (n=6, 3.7%) were aged 20-30 (Table 1 and Fig. 1).

In 24 (15%) men and 17 (10.6%) women, the cause of blindness was diabetic retinopathy, yielding a total of 41 (25.6%) blind people (Table 2). The annual incidence of diabetic retinopathy in relation to the total population was 2.16/100,000 inhabitants, and diabetic retinopathy was the cause of blindness in 0.22% of diabetic patients. No case of blindness due to diabetic retinopathy was recorded in patients younger than 30, while the highest occurrence was recorded in patients

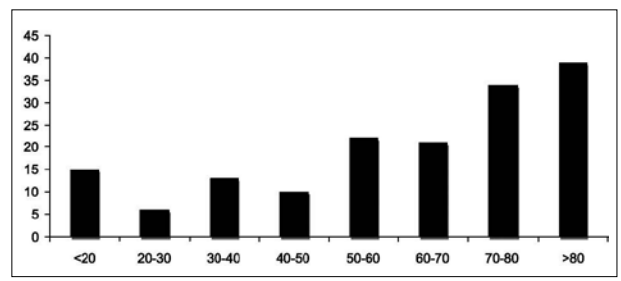

Fig. 1. Blindness distribution according to age (years).

Table1. Causes of blindness

Diagnosis	Male		Female		Total	
	n	%	n	%	n	%
Retinal detachment	4	2.5	1	0.6	5	3.1
Albinism	2	1.2	1	0.6	3	1.8
ARMD	4	2.5	15	9.3	19	11.8
Cerebral blindness	9	5.6	3	1.8	12	7.5
Glaucoma	14	8.7	7	4.3	21	13.1
Keratoconus	1	0.6	0	0	1	0.6
Congenital cataract	1	0.6	0	0	1	0.6
Myopia	7	4.3	7	4.3	14	8.7
Diabetic retinopathy	24	15	17	10.6	41	25.6
ROP	6	3.7	2	1.2	8	5
Retinal dystrophy	17	10.6	9	5.6	26	16.2
Trauma	5	3.1	0	0	5	3.1
Usher syndrome	2	1.2	1	0.6	3	1.8
Total	96	60.0	64	40	16	100

ARMD = age related macular degeneration; ROP = retinopathy of prematurity

aged 70-80 (n=14, 34%). In 38 (92.7%) patients, blindness developed due to proliferative diabetic retinopathy, and in 3 (7.3%) patients due to nonproliferative diabetic retinopathy (Fig. 2).

Discussion

One hundred and sixty blind people were registered in the Split-Dalmatia County in the last 10 years, with the annual incidence of 8.4/100,000 inhabitants. The leading cause of blindness was diabetic retinopathy, especially its proliferative form. The highest incidence occurred in older age groups; nevertheless, this study showed that diabetic retinopathy remained the leading cause of blindness in the working population, which is consistent with studies conducted by other authors. The incidence of blindness caused by diabetic retinopathy was 2.16/100,000 inhabitants, and diabetic retinopathy was a direct cause of blindness in 0.22% of diabetic patients, which is in accordance with previous reports in Croatia. In their study, Bućan *et al.*[14] assessed the incidence of diabetic retinopathy as the most common complication in children and young adults in the Split-Dalmatia County (66.7% of the subjects included in the present study). Korljan-Babić *et al.*[2] also specified diabetic retinopathy as the leading cause of blindness in Croatia.

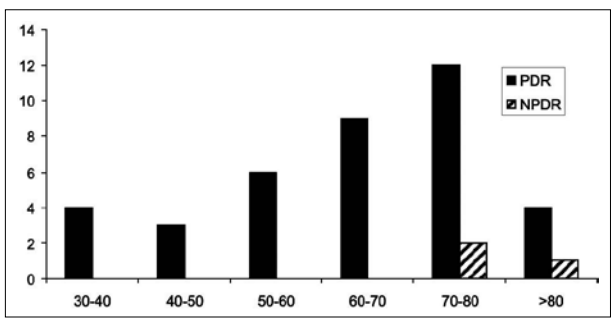

Fig. 2. Blindness caused by diabetic retinopathy according to age (years) and type (proliferative diabetic retinopathy, PDR; nonproliferative diabetic retinopathy, NPDR).

The increase in the incidence of diabetes, especially type 1, is an upcoming issue because, if left untreated

Table 2. Blindness caused by diabetic retinopathy according to gender

	Proliferative diabetic retinopathy		Nonproliferative diabetic retinopathy	
	n	%	n	%
Male	24	58.5	1	2.4
Female	15	29.2	2	4.8
Total	39	87.7	3	7.2

or poorly treated, it leads to the possibility of serious vision loss, especially in younger population.

Awareness that diabetic retinopathy remains the leading cause of blindness in the working population is a worrying fact. The occurrence of retinopathy is directly related to diabetes duration, and rarely occurs within the first 5 years. Early identification of high-risk patients contributes to better treatment aiming to prevent severe vision loss due to diabetic retinopathy. Sensitization of these patients regarding regular blood glucose control and ophthalmic check-ups is crucial. Proven effective interventions such as timely and clinically appropriate indications for established medications, laser or surgical treatment can effectively influence preservation of visual acuity.

This study also pointed to the importance of quality epidemiological studies, which, with their scientific evaluation issues, are an important factor supporting the health care system for these patients.

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Sažetak

ULOGA DIJABETIČNE RETINOPATIJE U SLJEPOĆI I SLABOVIDNOSTI U SPLITSKO-DALMATINSKOJ ŽUPANIJI 2000.-2010.

D. Galetović, I. Olujić, Lj. Znaor, K. Bućan, D. Karlica, M. Lešin i *T. Sušac*

Dijabetična retinopatija je peti najčešći uzrok sljepoće u svijetu. Cilj ove studije bio je istražiti broj slijepih u Splitsko-dalmatinskoj županiji u razdoblju od 2000. do 2010. godine te istražiti koliko je slijepih zbog dijabetične retinopatije. Retrospektivno smo analizirali 160 članova Udruge slijepih Splitsko-dalmatinske županije koji su registrirani između 2000. i 2010. godine. Najčešći uzroci sljepoće su: dijabetična retinopatija (25,6%), glaukom (13,1%), distrofija mrežnice (16,2%) i staračka makularna degeneracija (11,8%). Godišnja incidencija sljepoće je iznosila 8,4/100.000 stanovnika. Najveći broj slijepih je bio u dobnoj skupini od 70-80 godina (21,2%) i >80 godina (24,3%). U 24 (15%) muškarca i 17 (10.6%) žena sljepoća je bila uzrokovana dijabetičnom retinopatijom. Godišnja incidencija dijabetične retinopatije je iznosila 2,16/100.000 stanovnika. Nije pronađen niti jedan slučaj sljepoće uzrokovane dijabetičnom retinopatijom u dobi ispod 30 godina, dok je najveća učestalost nađena u dobnoj skupini od 70-80 godina (34%). U 92,7% slučajeva uzrok sljepoće je bila proliferativna dijabetična retinopatija, a u 7,3% neproliferativna dijabetična retinopatija. Ova studija ukazuje na dijabetičnu retinopatiju kao vodeći uzrok sljepoće. Rano otkrivanje rizičnih skupina je osnova prevencije i pravodobnog otkrivanja oftalmoloških promjena, na temelju čega se može pravodobno započeti s odgovarajućim liječenjem.

Ključne riječi: *Sljepoća; Dijabetes – komplikacije; Dijabetična retinopatija; Učestalost; Hrvatska – epidemiologija; Splitsko-dalmatinska županija*