Prevalence of Diabetic Retinopathy in a Population of Diabetics From the Middle East With Microvascular Ocular Motor Palsies

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Background: Vascular risk factors are increasing rapidly in the Middle East. Growing inactivity and obesity have contributed to an epidemic of Type 2 diabetes mellitus (DM) in the Arab population. Microvascular palsies of the third, fourth, and sixth cranial nerves, which occur in an isolated manner, are relatively common in patients with DM, hypertension, or other vascular risk factors.

Methods: In this retrospective analysis, patients with diabetes with microvascular palsies were assessed for the prevalence of diabetic retinopathy (DR). We compared these data with the prevalence of DR in the general population of diabetics in Saudi Arabia and to a similar published study done in an American population.

Results: In total, 126 patients with diabetes were included in the study. The sixth nerve was most frequently involved in 67 patients (53%). Seventy-seven patients (61%) had DR, compared with 49 (39%) without DR. The prevalence of DR in the general population of Saudi patients with diabetes ranged from 30% to 36.1%.

Conclusions: Our study demonstrated a higher prevalence of DR in patients with microvascular palsies compared with the general population of patients with diabetes in the Arab population. This is in contrast to a previous study in an American population. Our results might be secondary to differences between the 2 populations, in particular, the continued increase in the prevalence of vascular risk factors (mainly diabetes) and poor control of these risk factors in the Middle East.

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Vascular risk factors are increasing rapidly in the Middle East population. Growing inactivity and obesity are contributing to an epidemic of Type 2 diabetes mellitus (DM) in the Arab population. Available data indicate an increase in the prevalence of DM from 23.7% in 2004 to 30% in 2011 (1–6).

Microvascular palsies of the third, fourth, and sixth cranial nerves occur in an isolated manner and are relatively common in patients with diabetes, hypertension (HTN), or other vascular risk factors. In these cases, the etiology is suspected to be ischemic (7).

In 2002, Trigler et al (8) conducted a study of 306 patients with diabetes from 2 eye institutes in 2 American cities (Miami and Oklahoma City), analyzing the prevalence of diabetic retinopathy (DR) in patients with microvascular ocular motor cranial nerve palsies. After comparing their data with a control group (the Wisconsin epidemiologic study of diabetic retinopathy-WESDR), they came to the conclusion that the sample studied (patients with Type 2 DM with microvascular palsies) had significantly less DR than the control group.

We performed a similar study in a population in the Middle East, studying 126 patients with diabetes with microvascular palsies and determining the prevalence of DR.

METHODS

We conducted a retrospective review of medical records of patients with diabetes who presented to the emergency department at King Khaled Eye Specialist Hospital in Riyadh, Saudi Arabia from January 2012 to December 2013 with an isolated palsy of the third, fourth, or sixth cranial nerve. Periocular pain was acceptable, but there were no other neurological signs or symptoms. The study was conducted with approval of the ethics committee of the hospital.

Patients with microvascular palsies but without DM were excluded, as were patients with other causes of diplopia, including myasthenia gravis, thyroid eye disease, and previous head trauma. Also, we excluded patients with

nonrecovering microvascular palsies, even if another possible etiology was not identified.

Data collected from each chart review were: gender, age, type of DM, duration and treatment of DM, presence of HTN, affected ocular motor cranial nerve, presence of DR, elapsed time for full-resolution of palsy, previous episodes of diplopia, and whether a neuroimaging study was performed. For statistical analysis, we used the Statistical Package for the Social Sciences (SPSS; Armonk, NY) version 15.0 for Windows.

Objectives of our study were: 1) quantify the presence of DR in a group of patients with DM and ophthalmoparesis; 2) compare these data with the prevalence of DR in the general population of diabetics in Saudi Arabia; and 3) compare these data with a previously published American study (8).

RESULTS

Our study included 126 patients with diabetes ranging in age from 38 years to 87 years of age, and the results are summarized in Table 1. The sixth nerve was most frequently involved in 67 patients (53%), followed by the third nerve in 53 patients (42%), and fourth nerve in 3 patients (5%). Most patients in this sample were Type II diabetics (97%) compared with Type I diabetics (3%). The mean duration of diabetes was 14.9 years (range: 1–40 years). Most diabetics were treated with oral hypoglycemic agents (54.8%), whereas treatment insulin (5%) or diet (4%) was less frequent. In total, 3.2% of the patients included in the study were hyperintensive in addition to being diabetic.

TABLE 1. Diabetic patients with microvascular ocular motor cranial nerve palsies

	Number of Patients	Percentage
Gender		
Male	76	60.3
Female	50	39.7
CN involved		
III	53	42.1
VI	67	53.2
IV	3	4.8
DM		
Type I	4	3.2
Type II	122	96.8
DM treatment		
Insulin	51	40.5
Tablets	69	54.8
Diet	6	4.8
HTN		
Yes	67	53.2
No	59	46.8
DR		
NPDR	53	42.1
PDR	24	19.0
No DR	49	38.9
Recurrence		
Yes	36	28.6
No	89	70.6
Simultaneous	1	0.8
Brain MRI		
Yes	45	35.7
No	81	64.3

CN, cranial nerve; DM, diabetes mellitus; DR, diabetic retinopathy; MRI, magnetic resonance imaging; NPDR, nonproliferative diabetic retinopathy; PDR, proliferative diabetic retinopathy.

Regarding the presence or absence of DR, 77 patients (61%) had DR and 49 patients (39%) did not. Within the DR group, the most common type was nonproliferative (68.8%) compared with proliferative (31.2%).

One of the factors significantly associated with the presence of DR was the duration of DM (See **Supplemental Digital Content**, Table E1, http://links.lww.com/WNO/A181). The group with the highest proportion of DR was patients with 11–15 years duration of DM (83.3%), followed by the group with >21 years duration of DM (79%).

The average resolution time of the palsies was 3.94 months (range: 2–6 months). Six patients had recurrent ocular motor cranial nerve palsies. There was no significant association between the presence of HTN and recurrent palsies (Pears χ^2 test, test value 4.7, $P = 0.09$). In addition, there was no significant difference in DM duration between patients with vs without recurrent palsies (Mann–Whitney test, $P = 0.122$).

DISCUSSION

The main objective of our study was to calculate whether the prevalence of DR in patients with microvascular palsies was lower than, equal to, or greater than that in the general population of diabetics in the region. We found that more than half of our patients with microvascular palsies had DR (61.1% of patients vs 38.9% without DR). In previously published population studies, the DR prevalence in the general population of Saudi patients with diabetes ranged from 30% to 36.1% (1,9,10). This prevalence is below that in other countries such as the United States (11) and United Arab Emirates (12) but is similar to that in other countries such as India (13) and Jordan (14). It has been suggested that the prevalence of DR may be artificially low because of a lack of adequate screening in the region where many cases of nonproliferative DR are likely to go unnoticed.

Our results are in contrast to a similar study performed on an American population. Trigler et al (8) analyzed the presence of DR in a sample of 306 patients with diabetes with microvascular ocular motor palsies from 2 American cities (Miami and Oklahoma City). The prevalence of DR in the analyzed sample was 49.3% (considering any type of DR and any type of DM). For the subgroup of Type 2 DM, the DR prevalence was 38.5%. The authors also analyzed their results

with the prevalence of DR observed in the WESDR study, which was 57% (included all types of DM). Trigler et al concluded that patients with diabetes (especially patients with Type 2 DM) with microvascular palsies had significantly less DR than the general population of diabetics.

There are a number of potential reasons for the opposing conclusion in the 2 studies. First, the population of patients with diabetes in Saudi Arabia and the United States likely differ in their diabetic control. There is no adequate network of primary care in the Middle East that is responsible for proper monitoring of these patients. The lack of ophthalmologists in rural areas of Saudi Arabia is also a factor that facilitates progression of diabetes eye disease. Finally, the diabetic Arab population may have its own unique characteristics. Al Saleh and Bosley (6) studied a population of 47 patients with diabetes with microvascular palsies and found an increased frequency of microvascular palsies in the Arab population compared with other populations, an increased number of patients with recurrent and concurrent palsies, and an increased delay in recovery.

Limitations of our study include retrospective design, the lack of a control group, and the absence of details about diabetic control in our patient cohort. Nevertheless, the variability in occurrence of microvascular ocular motor palsies in different populations raises a number of important questions and deserves further study.

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