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The Incidence and Seasonal Variations of Acute Primary Angle-Closure Glaucoma

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A B S T R A C T

The incidence and seasonal variations of acute primary angle-closure glaucoma (APACG) was studied. It was based on a retrospective chart review of 121 hospital patients in Split, Croatia for the fifteen-year period from 1985 through 1999. The average incidence was 4.1 cases per 100,000 per year in the total population and 7.1 per 100,000 in those aged 30 years and older. APACG affects women almost twice more often than men. The incidence rate increased with age. No seasonal variations in the occurrence of APACG and no correlation with the mean duration of light exposure per season were found.

Introduction

Glaucoma is one of the leading causes of blindness[1,2]. Acute primary angle-closure glaucoma (APACG) is an urgent state in ophthalmology[3,4]. Over the past 40 years there have been few studies published in the incidence[5–7] and seasonal variations[8,9] of APACG in the general population. At the time this study was initiated, there was none from Croatia. In the present study we studied the incidence and seasonal variations of APACG in the city of Split for the fifteen-year period, from 1985 through 1999. The findings of this study are important, as they allow better disease evaluation and better planning of the ophthalmologic service in the treatment of APACG.

Patients and Methods

The Eye Clinic and University Hospital »Split« provide the only available ophthalmologic services in the city of Split, and to its almost 200,000 inhabitants[10]

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(Table 1). This, together with the fact that APACG necessitates either laser or surgical iridectomy and therefore has traceable records, enabled us to perform a true incidence study. This retrospective study of 121 consecutive patients was carried out during 15-year period between January 1, 1985, and December 31, 1999. Standard ophthalmic data were recorded in each case. Those included age, sex, date of onset of the attack and laterality of the affected eye. Criteria for APACG diagnosis and inclusion in the study were: ocular pain, blurring of vision, corneal epithelial edema, conjunctival injection, elevated intraocular pressure, presence of an occluded angle confirmed by gonioscopy. Cases of secondary angle-closure glaucoma such as neovascularisation, lens intumescence, or subluxation, were excluded. We also analyzed the seasonal incidence of APACG and compared to average duration of light exposure per season of the year (spring: March to May, summer: June to August, autumn: September to November and winter: December to February) over the same period. The data of sunshine in the city of Split was given by the Naval Meteorological Center Split of the Croatian Hydro-meteorological Institute. The results were submitted to statistical analysis and the chi-square method was used to calculate significance.

Results

In the 15-year period from 1985 through 1999, 121 cases of APACG were diagnosed and treated among residents of the city of Split. In 67 patients (55.4%), only the right eye was affected, and, in another 47 patients (38.8%), only the left eye was involved. There were 7 bilateral (5.8%), simultaneous attacks. The age at diagnosis ranged from 37 to 88 years (mean ± SD, 66.4 ± 10.8 years, for women 65.8 ± 11.4 and for men 67.5 ± 9.7 years). The sex distribution showed 79 women (65.5%) and 42 men (34.7%). The women: men ratio was 1.8: 1. The annual incidence was 4.1 per 100,000 in the total population and 7.1 per 100,000 in those aged 30 years and older. The incidence showed a step rise with age. The highest

TABLE 1
POPULATION OF SPLIT IN 1991

Age (yrs.)	Women	Men	Total
<30	41.9	42.7	84.6
30–39	16.9	15.8	32.7
40–49	14.2	13.2	27.4
50–59	12.4	12.4	24.8
60–69	9.6	8.1	17.7
>69	6.6	4.1	10.7
Total	101.6	96.3	197.9

* All figures are given as thousands

TABLE 2
AGE AND SEX RELATED ANNUAL INCIDENCES OF APACG*

Age (yrs.)	Women	Men	Women/men ratio	Total
<30	0.0	0.0	–	0.0
30–39	0.4 (1)	0.0	–	0.2 (1)
40–49	3.3 (7)	0.0	–	1.7 (7)
50–59	7.0 (13)	5.9 (11)	1.2	6.5 (24)
60–69	16.7 (24)	10.7 (13)	1.6	13.9 (37)
>69	34.3 (34)	29.3 (18)	1.2	32.4 (52)
Total	5.2 (79)	2.9 (42)	1.8	4.1 (121)

* Values are given as incidence per 100,000 persons per year (number of cases)

TABLE 3
SEASONAL DISTRIBUTION OF APACG

Season	Number of patients	%	Sunshine (h)	%
Spring	31	25.6	602	22.1
Summer	22	18.2	1020	37.4
Autumn	31	25.6	588	21.6
Winter	37	30.6	517	18.9
Total	121	100.0	2727	100.0

incidence was observed in both sexes in the group 70 years and older. The incidence was higher (chi-square = 5.77, p = 0.01) among women (5.2/100,000 per year) than among men (2.9/100,000 per year) (Table 2). The 15-year cumulative number of patients seen per season was 31 in spring, 22 in summer, 31 in autumn and 37 in winter. Although. the frequency of onset of APACG was little greater in winter than in the other seasons there were statistically insignificant (p = 0.57) seasonal variations in the occurrence of APACG. The average number of sunshine hours in Split was 602 in spring, 1020 in summer, 588 in autumn and 517 in winter and it showed this to be statistically significant difference (p < 0.001).

The study revealed no correlation of the seasonal incidence of APACG and the seasonal variations of light hours per season (Table 3).

Discussion

The literature contains very few reports of authors examining the incidence of APACG in the general population. In 1985, David et al. reported 126 cases of APACG that occurred over a 12-year period in the 250,000 of the Israel Nagev region[5]. This constitutes an incidence of 4.2 / 100,000 / year in the total population and 11.1 / 100,000 in the over-30 population. Teikari et al. reported an annual incidence of 3.8 cases / 100,000 per year in the population of Finland during a 10-year period[6]. The incidence of APACG in our study (4.1 per 100,000 population) was very similar to the incidence mentioned in the previous studies. The incidence of APACG is more common in yellow race than in whites[7,11]. So, among 1,551,000 Singaporeans mostly Chinese aged 30 years and older during the 1-year study period, 189 persons with APACG were seen. These represent the annual incidence of 12.2 per 100,000[7].

The observation that APACG affects females more often than males is not surprising because the prevalence of gonioscopically narrow angles and primary angle-closure glaucoma is greater among women than men of many races[12]. There is age-related increase in incidence of APACG because the anterior chamber shallows with age[13].

Our epidemiological study of relatively confirmed group reveals an annual incidence of about one case of APACG for every 24,390 people in the general population. If one assumes that an incidence similar to that found in this study (4.1 per 100,000 population) is representative of the population of Croatia, than approximately 100 cases of APACG should occur per year.

The theory that meteorological factors act as a trigger for APACG in anatomically predisposed persons has been proposed[8,9]. It is considered that this pecu-

liarity has been associated with the pupillary dilatation owing to diminished light.

In Finland, Teikari et al. reported that APACG incidences were higher in winter and in autumn compared to spring and summer[14]. In Israel, David et al. found a significant preponderance of attacks occurred during summer and winter, coinciding with periods of extreme temperatures[5]. They consider that cold weather and hot desert summer tends to drive everyone, especially elderly, indoors, where poorer light acts as a darkroom provocative test. In contrast to the previously published studies, our study shows no seasonal variations in the onset of APACG and no significant association was found between frequency of APACG and mean seasonal sunshine hours.

In our study there is incidence of APACG similar like in other Caucasians. Elderly women being the highest risk group. According to our results of examination, seasonal variations of the year and seasonal differences in insolation are probably of no essential importance for the occurrence of APACG.

The findings from this study will contribute to a better understanding of the epidemiology of APACG and, thereby, a better distribution of manpower resources to treat this disease.

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INCIDENCIJA I SEZONSKE VARIJACIJE AKUTNOG PRIMARNOG GLAUKOMA ZATVORENOG KUTA

S A Ž E T A K

Ispitivana je incidencija i sezonske varijacije akutnog primarnog glaukoma zatvorenog kuta u retrospektivnoj studiji na 121 bolničkih bolesnika u Splitu u Hrvatskoj tijekom 15 godina, u razdoblju od 1985. do 1999. godine. Prosječna godišnja incidencija bila je 4.1 na 100,000 stanovnika u ukupnoj populaciji, odnosno, 7.1 na 100,000 stanovnika starijih od 30 godina. Akutni primarni glaukom zatvorenog kuta zahvaća žene gotovo dva puta češće nego muškarce. Incidencija akutnog glaukoma raste sa starosnom dobi. Nije pronađena korelacija između pojave akutnog primarnog glaukoma zatvorenog kuta s prosječnim trajanjem insolacije godišnjih doba.