

# The Incidence of Optic Neuritis in Split-Dalmatia County, Croatia

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## ABSTRACT

*The aim of the study was to determine the incidence of monosymptomatic optic neuritis (MON) in residents of Split-Dalmatia County, Croatia. The 127 cases (83 female, aged 26.2±9.9 and 44 male aged 26.9 ±11.2) with MON presented between January 1985 and December 2001 were analyzed from hospital data. The annual incidence was 1.6 per 100,000 (95% CI, 0–3). The incidence among females was 2.2 (95% CI, 0–4.6) cases / 100,000 per year and 1.1 (95% CI, 0–3) among males. The difference in incidence rates for women vs. men was not significant ( $\chi^2=0.41$ ;  $p=0.52$ ), although it is more likely that a true difference exists. The peak incidence in both sexes observed in the group 20–29 years of age was 4.2 (95% CI, 0–10). The highest incidence of MON was found in spring (46 cases). In summary, the incidence of MON in Split-Dalmatia County during the 17 years period is relatively low.*

**Key words:** optic neuritis, incidence, Croatia

## Introduction

Optic neuritis is an acute disease of the optic nerve reflecting to any inflammatory optic neuropathy<sup>1–3</sup>. Usually there is no evidence for systemic, vascular, toxic, compressive and neurological signs. In the absence of history or signs of multiple sclerosis and systemic disease, acute optic neuritis is referred to as monosymptomatic or idiopathic. Optic neuritis is

an acute disease of the optic nerve attributed to focal inflammation associated with demyelinations not attributed to concomitant systemic disease. Optic neuritis can be the first manifestation of multiple sclerosis and can be presented as a forme fruste of multiple sclerosis<sup>3</sup>. Incidence of optic neuritis varying from 0.56 to 5.15 per 100,000 were reported<sup>4–14</sup>. A

few population-based studies of incidence of optic neuritis were reported<sup>6,9,10,12,14</sup>. The aim of this population-based study was to determine the incidence of monosymptomatic optic neuritis (MON) from the Mediterranean region of southern Europe in Split-Dalmatia County, Croatia, during the 17 years period from 1985 to 2001.

### Subjects and Methods

This study was made retrospectively on the 127 cases (83 female, aged  $26.2 \pm 9.9$  and 44 male aged  $26.9 \pm 11.2$ ) of MON, which were treated at the Eye Clinic Split from January 1985 to December 2001. In each case the diagnosis was confirmed by a chart review and cases were ascribed to the data of onset of symptoms rather than the data of admittance at hospital. In this study MON was defined according to the clinical criteria of Perkin and Rose<sup>15</sup>. Patients were included in the study if they had objective signs of optic nerve neuropathy, decreased and non-correctable visual acuity, visual field loss, impaired color vision and a relative afferent pupillary defect. Patients with identified causes of optic nerve neuropathy such as infections in adjacent regions, systemic diseases and retinal or other intraocular pathology with symptoms mimicking those of MON were excluded. Anterior ischemic optic neuropathy was distinguished from MON by the ophthalmoscopic finding, determination of the erythrocyte sedimentation rate and palpation of the temporal arteries. Patients with probable or definite multiple sclerosis according to the clinical criteria of Poser et al. were excluded as well<sup>16</sup>. Population data for Split – Dalmatia County were based on the findings of the 2001 Croatia census and total population was 463,676<sup>17</sup>. Population-based epidemiological research is possible in Split-Dalmatia County because medical care is essentially self-con-

tained within the community and almost all ophthalmic care for residents of this county has been provided by the Department of Ophthalmology, University Hospital Split, Croatia.

Statistical analysis was performed using t-test, Chi square test, Mann-Whitney U test and descriptive statistics. Confidence intervals (CIs) for incidence and relative risk (RR) were calculated at the level 95%<sup>18</sup>. Incidence rates were adjusted to the age and sex distribution using the European Standard Population.

### Results

In the 17-year period from 1985 through 2001, 127 cases of MON were diagnosed among residents in Split-Dalmatia County. The 83 (65.3%) of the 127 patients were women and 44 (34.6%) men. The mean age at onset of MON was 28.2 years (SD 9.9) for males, and 26.9 years (SD 11.2) for females. No statistical significant difference in incidence rate of MON between the ages was found ( $\chi^2=5.45$ ;  $p=0.14$ ).

The annual incidence was 1.6 per cent (CI, 0–3). The age and sex-specific incidence of MON is presented in Table 1. The incidence among males was 1.1 (95% CI, 0–3) cases / 100,000 per year and 2.2 (95% CI, 0–4.6) among females. The corresponding age-adjusted incidences were 1.3 per 100,000 person-years, 0.8 for male and 1.8 for females. The difference in incidence rates for women vs. men was not significant ( $\chi^2=0.41$ ;  $p=0.52$ ), although it is more likely that a true difference exists. The relative risk (RR) for women was 1.6 (95% CI, 0.4–6.6). The peak incidence in both sexes observed in the group 20–30 years of age was 4.2 (95% CI, 0–10). RR of 20–30 years of age was 1.91 (95% CI, 0.3–12.1) compared with 0–19 years of age.

The statistical significant seasonal variations in the incidence of MON were

**TABLE 1**  
AGE AND SEX-SPECIFIC INCIDENCE OF OPTIC NEURITIS IN SPLIT-DALMATIA COUNTY  
RESIDENTS, 1985 THROUGH 2001

Age group (years)	Men	Women	Total
0–19	1.2 (0–4.5)	3.5 (0–8.6)	2.2 (0–5.9)
20–29	2.6 (0–8.9)	5.8 (0–14)	4.2 (0–10)
30–39	2.9 (0–8.1)	2.4 (0–8.9)	2.7 (0–7)
> 40	0.2 (0–1.4)	0.7 (0–2.7)	0.5 (0–2)

\* Values are given as incidence per 100,000 people per year (95% confidence interval)

**TABLE 2**  
EPIDEMIOLOGICAL SURVEYS OF OPTIC NEURITIS INCIDENCE

Place and study period	Incidence			Age group with peak incidence
	Female	Male	Total	
Olmsted, USA: 1935–1991	7.51	2.60	5.15	40–45
Carlisle, UK: 1955–1961	–	–	1.60	–
Israel: 1955–1964	–	–	0.56	–
Uusimaa, Finland: 1970–1978	3.2	1.5	2.4	30–39
Vaasa, Finland: 1970–1978	2.8	1.8	2.3	30–39
Finland: 1967–1971	1.15	0.71	0.94	20–29
Hanover, Germany: 1976–1977	3.30	1.90	2.69	21–44
Sardinia, Italy: 1977–1986	–	–	2.40	–
Stockholm, Sweden: 1990–1995	2.28	0.59	1.46	30–34
Split, Croatia: 1985–2001	2.2	1.1	1.6	20–29

noted ( $\chi^2=9.2$ ;  $p=0.02$ ). The highest incidence of MON was found in spring (46 cases). The seasons in this calculations were; spring (March, April, May), summer (June, July, August), autumn (September, October, November), winter (December, January, February).

## Discussion

This study provides the population-based data on the incidence of MON, because the Department of Ophthalmology, University Hospital Split, Croatia has provided most ophthalmic care for residents of this county. An incidence study requires the complete and accurate ascertainment of all persons who have had

MON during the defined period. Our study showed that the incidence of MON occurred in Split-Dalmatia County is a relatively low. The highest incidence of MON was found in the age group 20–29 years and male to female ratio was 1.6. The MON incidence found in surveys in USA (Olmsted), Finland, Germany (Hanover) and Italy (Sardinia) was higher than in our study<sup>7,8,12,13</sup>. Epidemiological surveys of optic neuritis incidence are shown on Table 2. Kahana et al. found in population-based study with a corresponding age-adjusted MON incidence of 0.56 what represents the lowest incidence<sup>9</sup>. Women in almost all surveys had a substantially higher MON incidence than did men<sup>8,10–14</sup>. The incidence for female in

our study is similar incidence found only in survey in Sweden<sup>14</sup>. The relative risk for women was 1.6. Although in our study the difference in incidence rates for women vs. men was not significant ( $p=0.52$ ), it is more likely that a true difference exists. This may be explained with relatively small number of cases of MON in our study, which resulted in wide CIs surrounding point estimates of incidence rates and in statistically non-significant differences. The relation between seasonal distribution and clinical onset of MON was reported<sup>19–21</sup>. The results of meta-re-

view of seasonal patterns in optic neuritis suggest that MON tended to present at variable frequencies ranging from a high in spring to a low in winter, which is in accordance with our results<sup>21</sup>. The highest incidence of MON in our region was found in spring.

In conclusion, our population-based study found that incidence of MON in Split- Dalmatia County, Croatia is relatively low and the difference in incidence rates for women vs. men was not statistically significant.

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## **INCIDENCIJA OPTIČKOG NEURITISA U SPLITSKO-DALMATINSKOJ ŽUPANIJI, HRVATSKA**

### **S A Ž E T A K**

Cilj ispitivanja bio je utvrditi incidenciju akutnog optičkog neuritisa (MON) kod stanovništva Splitsko-Dalmatinske županije. Analizirana su 127 bolesnika liječena u bolnici (83 žene u dobi od  $26.2 \pm 9.9$  godina i 44 muškarca u dobi od  $26.9 \pm 11.2$  godina) u razdoblju od siječnja 1985 do prosinca 2001. Godišnja incidencija na 100.000 stanovnika bila je 1.6 (95% CI, 0–3). Incidencija kod žena bila je 2.2 (95% CI, 0–4.6) a kod muškaraca 1.1 (95% CI, 0–3) na 100.000 stanovnika. Nisu nađene značajne razlike u incidenciji između žena i muškaraca ( $\chi^2=0.41$ ;  $p=0.52$ ), premda je vrlo vjerojatno da prava razlika postoji. Najviša incidencija je ustanovljena u ljetnom periodu kod 46 bolesnika i u dobnoj skupini od 20–30 godina (4.2, 95% CI, 0–10). U zaključku, incidencija MON-a u Splitsko-Dalmatinskoj županiji u 17-godišnjem periodu je relativno niska.