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Prevalence of Hospitalized Patients with Sarcoidosis in Croatia

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A B S T R A C T

The aim of this study was to investigate the prevalence of hospitalized patients of sarcoidosis in the Republic of Croatia, its distribution in relation to sex and age as well as its geographical distribution. The data on sarcoidosis patients hospitalized in Croatia in the last six years, from 1997 to 2002, were analyzed retrospectively. The prevalence of sarcoidosis patients hospitalised in the Republic of Croatia is 4.1/100,000. The prevalence among women is 4.7 and among men 3.5 per 100,000 persons, with a ratio of 1.4:1. The disease more frequently occurs in the regions with a continental climate than in the Mediterranean zone. The ratio of sarcoidosis patients in the continental zone to the Mediterranean zone is 1.5:1. It occurs predominantly among the adults. Over the investigated period, in our country we have not registered any case of sarcoidosis among children. It occurs more frequently at a younger age and therefore 44.5% of the patients with sarcoidosis were between 20 and 39 years of age, 40.1% were between 40 and 59 years of age and 15.3% were more than 60 years old.

Key words: *sarcoidosis, prevalence, hospitalization, age, gender*

Introduction

Sarcoidosis is a systemic granulomatous disease of unknown cause. It is characterized by the accumulation of CD4+ T-lymphocytes, which causes Th-1 immune response in the affected organs and tissues. Most frequently it occurs in lungs, lymphonodes, liver, skin and eyes, but also in the other organs[1]. Acute forms of sarcoidosis generally spontaneously regress and have a good prognosis, whereas its chronic forms are progressive with a poor prognosis[2].

The ethiology of sarcoidosis is still unknown. There are several theories on the causes of the disease. Nowadays it is considered that in genetically predisposed people, one or more microorganisms that act in a non-infectious way cause a sarcoid granulomatous response[3].

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Sarcoidosis occurs all around the world and among all races, but with a variable prevalence. It is more frequent in the north than in the south. In the United States, the disease occurs more often among the African Americans and Puerto Ricans than other groups. Furthermore, it is more frequent among the Irish than the English[4].

Sarcoidosis occurs among both sexes all around the world, predominantly among adults, most frequently between 20 and 40 years of age[5]. It is more frequent among women than men; according to the ACCESS study carried out in the United States on 736 patients the ratio is 1.7:1[6].

Patients and Methods

The data of the Department of Health Statistics of the Croatian Institute for Public Health, registered in the hospital Patient Statistical Forms under diagnosis D86 (which is the code for sarcoidosis according to the 10th revision of International Classification of Diseases [ICD-10]) in the period from 1997 to the end of 2002, were analysed retrospectively. The system of registration of hospitalised patients is run under ICD-10 codes from year 1995. We validated the system through checking the number of diagnosed patients in our hospital with the number of patients registered with the ICD-10 code D86 in the Department of Health Statistics for last three years and it shows 99.65% accuracy (288 diagnosed sarcoidosis patients vs. 289 registered with D86 ICD-10 code). The number of hospitalised patients was analysed according to age, sex and the distribution in the counties of the Republic of Croatia. The sex and age standardized prevalence ratio was calculated according to population data gathered from the National population survey from the year 2001. Odds ratios and 95% confidence intervals were calculated by OpenEpi (version 0.99, Andrew G. Dean and Kevin M. Sullivan, Atlanta, GA, USA). Statistical significance was assumed for $p<0.05$.

Results

General prevalence

According to the data of the Department of Health Statistics of the Croatian Institute for Public Health, 1196 patients were discharged from hospital with a diagnosis of sarcoidosis in the period from 1997 to the end of 2002. From the data of the Department of Statistics it was not evident how many times the patients were hospitalised. On average two hundred patients per year were treated for sarcoidosis in Croatian hospitals. The prevalence of hospitalised patients is 4.1/100,000 in total.

Geographical distribution

Sarcoidosis is not equally distributed among the population. There are differences in its occurrence. Among the patients treated in the Croatian hospitals the standardized prevalence was the highest in the County of Požega and Slavonija (8.1/100,000) followed by city of Zagreb (6.9/100,000), the County of Međimurje (6.3/100,000) and the County of Virovitica and Podravina (5.1/100,000) (black in Figure 1). The lowest prevalence was in the County of Vukovar and Srijem (2.3/100,000) followed by counties Primorsko-Goranska (2.5/100,000), Istarska (2.5/100,000) and Šibenik and Knin (2.7/100,000) (white in Figure 1). More patients affected with the disease came from the regions with a continental climate than with a Mediterranean climate. In the zone with a continental climate, which has about three million inhabitants, sarcoidosis was diagnosed on average in 155 persons per year (4.6/100,000). In the zone with a Mediteranean climate, which about 1.4 million inhabitants, the disease is diagnosed in 45 persons per

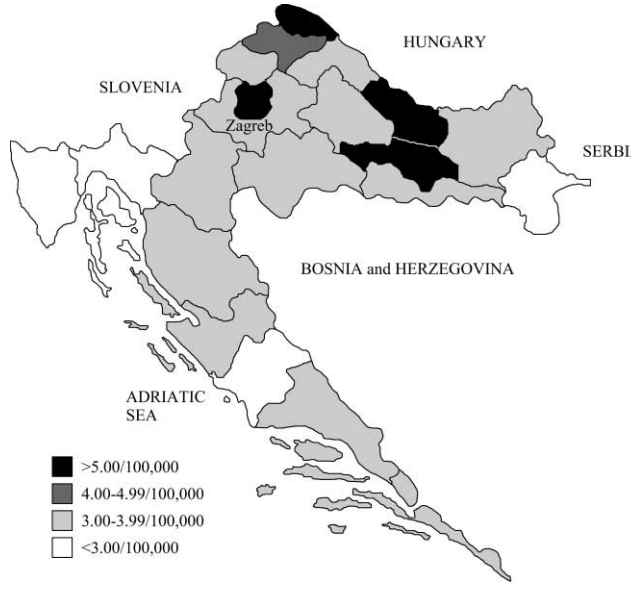

Fig. 1. Prevalence of sarcoidosis by counties.

year (3.0/100,000; odds ratio [OR], 1.54; 95% confidence interval [CI], 1.34–1.77; p<0.001).

Prevalence by sex and age

Among 1,196 patients affected by sarcoidosis there were 693 females and 503 males. The prevalence among women was 4.7/100,000 and among men 3.5/100,000 persons/year (OR=1.36; 95% CI=1.21–1.54; p<0.001; Figure 2).

In Croatia there were no cases of a diagnosed sarcoidosis in persons till the age of 19 years. 533 saircoidosis patients were between 20 and 39 years of age (44.5%), among them 313 women (7.4/100,000) and 220 men (5.9/100,000). 480 saircoidosis patients were between 40 and 59 years of age (40.1%), among them 280 women (8.7/100,000) and 200 men (4.5/100,000); and 183 persons were older than 60 years (15.3%), among them 100 women (1.9/100,000) and 83 men (2.8/100,000; Figure 3).

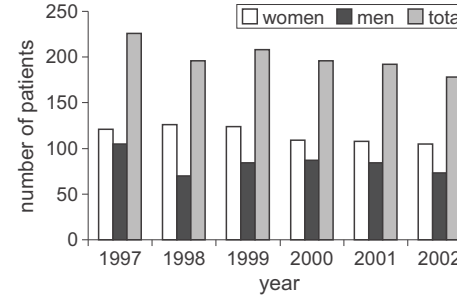

Fig. 2. The number of persons affected by sarcoidosis by sex and year of diagnosis in the period from 1997 to 2002.

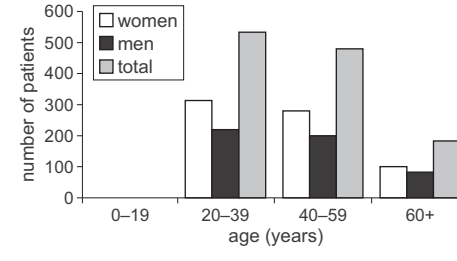

Fig. 3. The number of sarcoidosis patients by age and sex.

Discussion

Sarcoidosis is a systemic disease of unknown etiology. Formerly it was considered as a rare disease, but numerous epidemiological studies from all over the world provide evidence that it is significantly more frequent than previously thought. The most probable reason for such findings lies in a better knowledge about the disease and in more accurate methods of detection. It occurs all around the world and among all races, but with a variable incidence and prevalence.

Epidemiological studies provide evidence that sarcoidosis is more frequent in the north than in the south. In Sweden the prevalence is 64, in Denmark about 20, in Finland 27/100,000 persons, whereas it is much lower in the countries located in the south. Thus, in Italy the prevalence is 0.5 and in Spain it is 1.4/100,000 persons. In the eastern European countries such as Poland the prevalence is 1.3, in the Czech Republic it is 3.5 and in Japan 1/100,000. The prevalence in Hungary is 4.3, in Germany 12 and in Greece 7/100,000 persons[7] (Table 1).

TABLE 1
PREVALENCE OF SARCOIDOSIS IN CROATIA AND DIFFERENT COUNTRIES

Country	Prevalence (per 100,000 persons)
Croatia	4.1
Hungary	4.3
Italy	0.5
ex-Yugoslavia	2.5–3
Spain	1.4
Sweden	64
Finland	27
Denmark	10
Great Britain	27
Germany	12
Poland	1.3
Czech R. & Slovakia	3.5
Greece	7
US (Caucasians)	6.1
(African Americans)	50–70

Prevalence also varies according to races and nations. Among African Americans it is higher than 50/100,000 whereas the prevalence among Puerto Ricans who live in America is between 30–40/100,000. Among the Caucasians in America the prevalence is 6.1/100,000. In Great Britain it is 27/100,000 among men and women. However, the prevalence among Irish women living in London is 215 and among Irish men 97/100,000[8].

According to the data from 1985, the prevalence of sarcoidosis in countries of ex-Yugoslavia was 2.5–3/100,000. The data available from the European Congress on Sarcoidosis held in Novi Sad in 1980 state the incidence in Vojvodina was 3 and in Slovenia 7/100,000. The data on prevalence of sarcoidosis in Croatia dates back to 1974 and it was then 4.15/100,000. Since that period there were no data published on the prevalence of sarcoidosis in Croatia[9]. The only recent data, which we had up to now, refer to Dalmatia (south Croatia) where incidence varies between 2–3/100,000[10].

Analysing the data issued by the Department of Statistics of the Croatian Institute for Public Health in the last six years, we calculated the prevalence of hospitalised patients in Croatia as 4.1/100,000. Among women it was 4.7/100,000 and among men 3.5/100,000, with the OR being 1.36. The ratio of prevalence between women and men in Spain is 2:1, in Japan 3:1 and in the US, where the sample is the largest; the ratio is 1.7:1. In Great Britain and Germany there were no differences in prevalence between men and women[11].

In Croatia, the counties with a continental climate have a higher prevalence than those situated in the south (OR

1.54). These data are in accordance with the statement that sarcoidosis is more frequent in the northern regions. Therefore continental Croatia has prevalence similar to Hungary and Mediterranean Croatia to Spain.

Sarcoidosis is the disease of adults, although there is evidence that children can be affected, most often between 9 and 15 years of age with an incidence of 2.2–2.7/1,000,000. For example, there is a report in literature on a two-month-old child suffering from sarcoidosis. In the US it is more frequent among the children of African Americans; in London among the children whose parents are of Indian descent and in Japan among the children whose parents come from the other Asian countries[12]. In Croatia, in the investigated period (1997–2002), no cases of sarcoidosis among children were diagnosed. Among adults the disease is more frequent between 20 and 40 years of age[13]. This corresponds with our data which, also show the highest prevalence of sarcoidosis in patients at the age between 20 and 40 (44.5%, 6.63/100,000).

Sarcoidosis is the disease that has been diagnosed more often in the last decades. Through epidemiological studies we cannot identify its cause but they can help us by giving us the guidelines for our further research and for future healthcare planning.

REFERENCES

1. PEROŠ-GOLUBIČIĆ, T., Sarkoidoza. In: VRHOVAC, B. (Ed.): Udžbenik interne medicine. (2003). — 2. PEROŠ-GOLUBIČIĆ, T., A. IVIČEVIĆ, A. BEKIĆ M. ALILOVIĆ, J. TEKAVEC, S. SMOJVER, Coll Antropol., 25 (2001) 349. — 3. MCGRATH, D. S., N. GOH, P. J. FOLEY, R. M. DU BOIS, Sarcoidosis Vasc. Diffuse Lung Dis., 188 (2001) 149. — 4. GERENT, D. J., Y. HOSODA, Epidemiology. In: JAMES, D. G. (Ed.): Sarcoidosis and other granulomatous disordes. (Marcel Dekkers inc., New York, 1994). — 5. HOSODA, Y., M. YAMAGUCHI, Y. HIRAGA, Clin. Chest Med., 18 (1997) 681. — 6. HUNNINGHAVE, G. W., U. COSTABEL, M. ANDO, R. BAUGHMAN, J. F. CORDIER, R. DU BOIS, A. EKLUND, M. KITAICHI, J. LYNCH, G. RIZZATO, C. ROSE, O. SELROOS, G. SEMENZATO, O. P. SHARMA, Sarcoidosis Vasc. Diffuse Lung Dis., 16 (1999) 149. — 7. HENKE, C. E., G. HENKE, L. R. ELVEBACK, C. M. BEARD, D. J. BALLARD, L. T. KURLANA, Am. J. Epidemiol., 123 (1986) 840. — 8. PATTISHAL, E. N., E. L. KENDIG, Jr., Sarcoidosis in children. In: JAMES, D. G. (Ed.): Sarcoidosis and other granulomatous disordes. (Marcel Dekkers inc., New York, 1994). — 9. DJURIC, B., Sarcoidosis, 7 (1990) 110. — 10. MIŠE, K., S. JANKOVIĆ, J. TOCILJ, Z. ANČELINOVIĆ, Z. IVANČEVIĆ, G. FOREMPOHER, Sarcoidosis Vasc. Diffuse Lung Dis., 18 (2001) 60. — 11. FITE, E., J. M. ALSINA, J. MANA, R. PUJOL, J. RUIZ, J. MORERA, Sarciodosis Vasc. Diffuse Lung Dis., 13 (1996) 153. — 12. PATTISHALL, E. N., G. L. STROPE, S. M. SPINOLA, F. W. DENNY, J. Pediatry, 108 (1986) 169.

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PREVALENCIJA HOSPITALIZIRANIH BOLESNIKA SA SARKOIDOZOM U HRVATSKOJ

S A Ž E T A K

Cilj ovog članka je prikazati prevalenciju hospitaliziranih bolesnika sa sarkoidozom u Republici Hrvatskoj, spolnu i dobnu raspodjelu oboljelih i regionalnu zastupljenost. Retrospektivno su obrađeni podaci oboljelih od sarkoidoze hospitaliziranih u Hrvatskoj zadnjih šest godina, od 1997. do 2002. Prevalencija hospitaliziranih bolesnika u Republici Hrvatskoj oboljelih od sarkoidoze je 4.1/100.000. Prevalencija je u žena 4.7, a u muškaraca 3.5 na 100.000 osoba, u omjeru od 1.4:1. Bolest se češće javlja u područjima kontinentalne klime nego u mediteranskom pojasu. Odnos oboljelih u kontinentalnom području prema mediteranskom je 1.5:1. Pretežno se javlja kod odraslih, a u našoj zemlji u ispitivanom razdoblju nije zabilježen niti jedan slučaj sarkoidoze kod djece. Češće se javlja kod mlađih odraslih osoba pa je tako 44,5% bolesnika u kojih je dijagnosticirana sarkoidoza bilo u dobi između 20–39 godina, 40,1% je u dobi od 40 do 59 godina, a 15,3% bilo je starijih od 60 godina.