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ORIGINAL ARTICLES

Outbreak report

REAL OR MEDIA-MEDIATED OUTBREAK OF COXSACKIE INFECTIONS IN 2002 IN GREECE ?

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The purpose of this study was to provide evidence about the existence of a coxsackie B outbreak in Greece in 2002 by comparing data of laboratory confirmed coxsackie B recent infections in northern Greece between 1998-2001 with data from 2002, supposedly an epidemic year.

The infections were confirmed serologically, using the indirect immunofluorescence method detecting IgM antibodies for coxsackie B1-B6 viruses. Sera from 2701 patients residents of northern Greece who were suspected to be suffering from coxsackie B virus infections were examined: 2056 between 1998 and 2001, and 645 in 2002.

The comparison between the results of laboratory confirmed cases and data available at the laboratory between the two periods showed that:
- The total number of patients examined per year was higher in 2002 (645 versus an annual average of 514 in 1998-2001).
- The proportion of laboratory confirmed recent infections was lower in 2002 (27.8% versus 32.7%) and the estimated incidence was 0.66/10 000 for 2002 and 0.32-0.84/10 000 for 1998-2001.
- The age distribution differed: the proportions of cases in children versus cases in adults were reversed in 2002 compared with 1998-2001, with a higher proportion among children in 2002. The difference between the two periods was statistically significant. Children aged 3-5 years were the age group most affected in 2002.
- Seasonal distribution remained the same for both periods (peaks in spring and autumn). In 2002, three fatal cases occurred in April, but no deaths were reported in 1998-2001.
- The clinical syndromes involved also differed: cases of respiratory infections, mainly pneumonia, rose from 5.75% to 24.3% in children in 2002 and cases of myopericarditis rose in adults from 13% in 1998-2001 to 29.5% in 2002.
The last finding, combined with the involvement of the media (because of the three fatal cases) and the panic in the general public that followed suggested that an outbreak had occurred, but we conclude that there was no outbreak.

Introduction

In early April 2002, several cases of acute respiratory infections with myocarditis and pericarditis were initially reported from Crete, followed by two deaths in women aged 45 and 48 years. More cases were later reported from Ioannina in northwest Greece followed by one death in a 32 year old woman. Postmortem examination showed that all three deaths were attributable to myocarditis. Several other reports of non-fatal cases of myopericarditis following respiratory infections were then reported to the Hellenic Center for Infectious Disease Control (HCIDC) from all over Greece. The media coverage of these cases exaggerated the severity of the situation, and the government decided to close all schools throughout Greece three days before the start of the scheduled Easter holidays.

Reports of the cases and laboratory findings at the time have already been published [1,2] and suggest that coxsackie B viruses were the causative agents.

This study aims to find evidence for the existence of an outbreak and, if this is found, to assess the extent of the outbreak.

Materials and methods

To compare data from our laboratory for coxsackie B infections diagnosed between 1998-2001 and in 2002, sera from 2701 patients admitted to hospital for suspected coxsackie B infections between 1998-2002 were examined. The sera were sent directly to the laboratory from hospitals in northern Greece between 1998-2002.

Although there is no established network for reporting coxsackie B infections in Greece, the clinical virology unit of our university microbiology laboratory performed serological tests to confirm these infections for all hospitals in northern Greece since 1998, because enteroviral infections are not included in the routine diagnostic panel of hospital laboratories in northern Greece.

A case of recent coxsackie B infection was defined as any person with clinical symptoms compatible with coxsackie B infection and detectable IgM antibodies during the entire period under study.

The method used was indirect immunofluorescence for the detection of IgM antibodies to coxsackie B1-B6 viruses (Bios GmbH Labordiagnostik).

The sera were divided into two groups. Group I consisted of 2056 sera from patients for the period 1998-2001, a mean of 514 patients

per year, and group II consisted of 645 patients for the year 2002. The features compared were:
a. The total annual number of sera examined
b. The proportion of confirmed recent infections
c. The age distribution of confirmed cases
d. The seasonal distribution of confirmed cases
e. The clinical syndromes involved

Statistical analysis was performed using the SPSS software (version 11.5). Descriptive statistics and the 2 test were used to estimate different frequencies and the incidence of confirmed infections per year, and to compare the two groups for all the years studied (1998-2002).

Results

The total number of sera examined was 2056 for group I and 645 for group II. Three hundred and twelve samples were examined in 1998, 534 in 1999, 644 in 2000 and 566 in 2001, a mean of 514 per year for group I [TABLE 1].

T ABLE 1

Examined samples and recent infections during 1998-2002, Greece

Year	Examined samples	Recent infections	Incidence (per 10⁵)
1998	312	86 (27.6%)	3.2
1999	534	226 (42.3%)	8.4
2000	644	212 (32.9%)	7.8
2001	566	147 (26.0%)	5.4
Average per year	**514**	**168 (32.7%)**	**6.3**
2002	645	179 (27.8%)	6.6

For group I, 32.7% of all samples were confirmed to be recent coxsackie B infections (mean annual number of 168 cases). For group II, this proportion was 27.8% (179 cases) [TABLE 2]. The exact rates of confirmed cases for the years 1998, 1999, 2000 and 2001 were 27.6%, 42.3%, 32.9% and 26%, respectively. The population of northern Greece for the period studied was 2 684 663, and so the estimated incidence of confirmed coxsackie B infections for each of the years 1998-2002 was 3.2, 8.4, 7.8, 5.4 and 6.6 per 100 000 inhabitants, respectively [TABLE 1].

T ABLE 2

Sera examination from patients suspected as suffering from Coxsackie B infections during 1998-2002, Greece

Patients	No. of examined samples		No. (%) of recent infections	
	1998-2001*	2002	1998-2001*	2002
Children	225	417	57 (11.1%)	145 (22.5%)
Adults	289	228	111 (21.5%)	34 (5.3%)
Total	**514**	**645**	**168 (32.7%)**	**179 (27.8%)**

*Average per year

In the period 1998-2001, 33.9% of all confirmed cases were diagnosed in children (57/168), compared with 81% in 2002 (145/179). A total of 66.7% (111/168) of all confirmed cases were diagnosed in adults, compared with 19% (34/179) in 2002. Thus, the proportions of cases in children versus adults were reversed in 2002 compared with 1998-2001.

The age distribution of recent coxsackie B infections for both groups is shown in Figure 1. A statistically significant rise is found (p <0.001) for group II in children aged 3-5 years old, while there is a considerable decrease (p 0.017) of recent infections in children aged 6-10 years for group II. As for adults, over the age group most affected was >60 years, while morbidity decreased in the 41-60 year group in 2002.

Age distribution of Coxsackie B infections in 1998-2001 and 2002, Greece
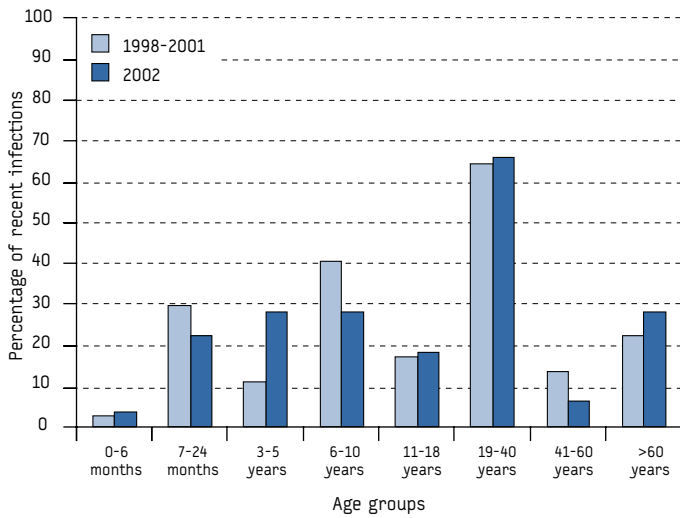

Figure 2 presents the seasonal distribution of these infections for both groups. No difference was found between the two groups. Coxsackie B infections seem to peak in spring and autumn.

Comparative seasonal distribution of recent Coxsackie B infections in 1998-2001 and in 2002, Greece

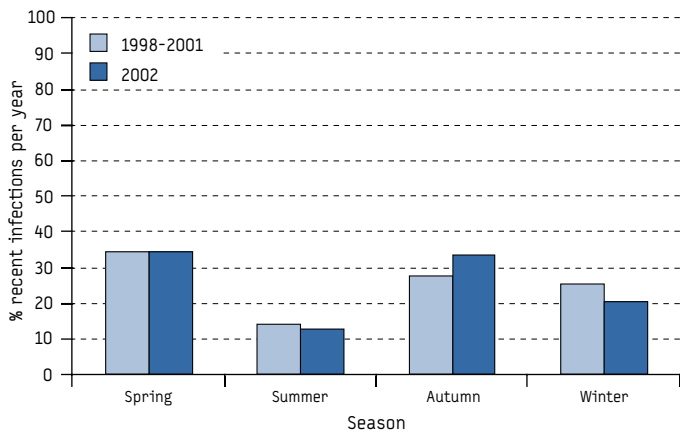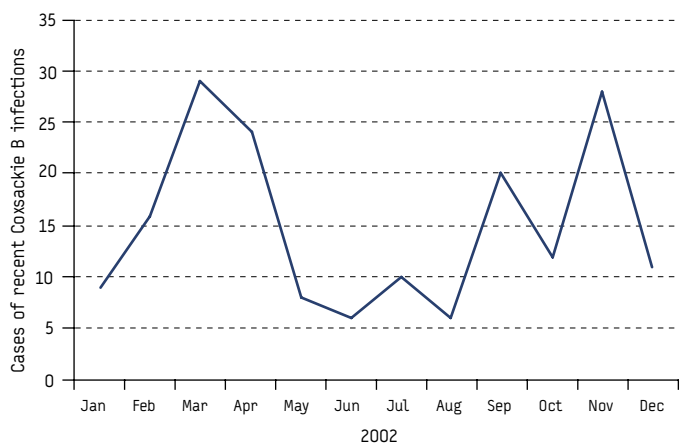Figure 3 shows the epidemic curve of all confirmed coxsackie B infections in 2002. Two peaks were observed: one in March-April (53 cases) and one in November (28 cases).

Monthly distribution of Coxsackie B infections in 2002, Greece

A correlation between recent coxsackie B infections and clinical syndromes appears in Figure 4 for children and in Figure 5 for adults. It seems that the proportions of fever and rash (p 0.002), meningitis (p 0.005) and gastrointestinal infections (p 0.001) decreased in group II while the proportion of respiratory infections increased considerably (p 0.002) for the same group. As for adults, the only remarkable change between the two groups is the considerable increase of the proportion of myopericarditis cases in 2002 (p 0.029).

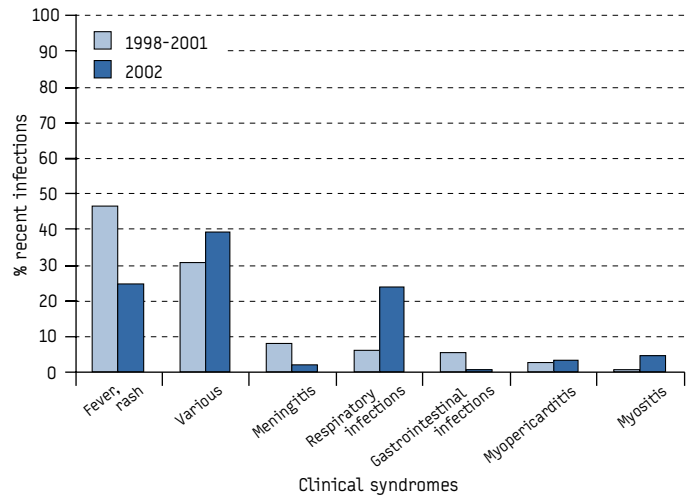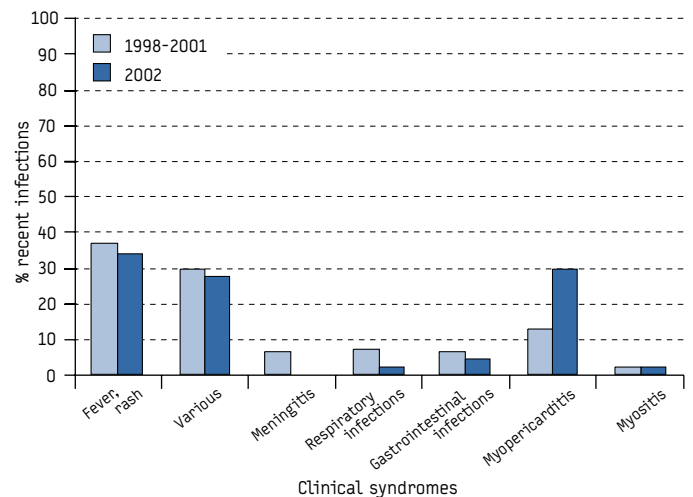**Correlation between Coxsackie B infection and clinical syndromes in children, 1998-2001 and 2002, Greece**

Correlation between Coxsackie B infection and clinical syndromes in adults, 1998-2001 and 2002, Greece

Discussion and conclusions

The coxsackie B viruses, members of the Picornaviridae family, are known as causative agents of infections occurring in humans with different clinical features, such as rash, fever, epidemic myalgia, aseptic meningitis, myositis, myocarditis, pericarditis, dilated cardiomyopathy, respiratory and gastrointestinal infections [3].

Despite the fact that coxsackie viruses are endemic in many countries, outbreaks do occur [4-6].

Comparison of data available in this laboratory with the results of the tests which were performed seems to show that the total number of suspected cases did not increase dramatically in 2002, despite the alertness of the clinicians (645 cases in 2002 compared with an annual mean of 514 between 1998 and 2001). In fact, the proportion of laboratory confirmed cases decreased in 2002 (27.8% compared

32.7%), which is understandable if one considers the pressure felt by clinicians to ask for laboratory confirmation even for cases that they normally would not have tested.

Children were predominantly affected in 2002. More cases were identified in children (145 cases compared with a mean annual number of 57 cases from 1998-2001) and fewer cases in adults (34 compared with a mean annual number of 111 for the period 1998-2001). A smaller proportion of examined sera from adults tested positive in 2002 (5.3%) than in 1998-2001 (21.5%).

There was a statistically significant movement of the morbidity to younger children (3-5 years old) followed by reduced morbidity in the next age group (6-10 years old) in 2002.

Throughout the 1998-2002 period, seasonal distribution showed more cases in spring and in autumn, although in other countries enteroviruses circulate more frequently in summer [7]. No difference in the proportion of confirmed cases between the two groups studied was found. In 2002, there were peaks (March-April and November), and the three fatal cases occurred in April.

The comparison of clinical syndromes in cases of coxsackie B infections in both periods showed that respiratory infections, mainly pneumonia cases, predominated among children in 2002, while in adults the only remarkable change was a higher proportion of cases with myopericarditis although absolute numbers of myopericarditis cases were actually lower than in the period 1998-2001. Such cases do occur from time to time [8,9]. No fatal cases were reported in the years 1998-2001.

Therefore, the impression of a severe outbreak of coxsackie B infections in Greece in 2002 seems to have been the result of the combination of three different factors:

1. The increased proportion of myopericarditis cases, probably due to more cardiotropic strains of the circulating viruses in 2002,

2. The three fatal events which attracted the attention of the media,
3. The panic in the general public following headline news about the fatal cases in the media.

In conclusion, there is no evidence for a large outbreak of coxsackie B infections in Greece in 2002, though there was an increased number of cases in young children with more severe infections.

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ORIGINAL ARTICLES

Outbreak report

Outbreak of tinea corporis gladiatorum, a fungal skin infection due to *Trichophyton tonsurans*, in a French high level judo team

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An outbreak of 49 cases of tinea corporis gladiatorum due to *Trichophyton tonsurans* infection occurred in a high level judo team of 131 members in Orléans, central France, between October 2004 and April 2005. The team was divided into 5 groups: cadet-junior boys (n=44), cadet-junior girls (n=33), male university students (n= 15), female university students (n=21), and a group called 'pôle technique' made up of high level judokas who have finished academic study (n=18). The outbreak involved 86% of the cadet-junior boys, but only 6 men in the 'pôle technique' (33%) and only 5 of the 69 other team members (7%) (cadet-junior girls and university students). We describe the outbreak and the results of a survey that found a known risk factor for the 'pôle technique': sharing an electric shaver. Personal hygiene practices were found to be very good among the cadet-junior boys. The high attack rate in this group may be linked to the poor shower facilities in the gymnasium where they practiced that led them to have their showers several hours after the end of daily practice.

Introduction

Tinea corporis gladiatorum is a fungal infection due to *Trichophyton tonsurans*, well known in wrestlers and widespread among wrestling teams worldwide [1,2]. Judokas were considered free of this fungal skin infection until Shiraki et al described cases in judokas at a university in Japan in 2004 [3].

We were involved in the treatment and the investigation of an outbreak of 49 cases of tinea corporis gladiatorum that took place between October 2004 and April 2005 among the 131 high level judokas who were members of the Pôle France Orléans, a sport-study

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