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The Kobe Earthquake and Recurrent Endogenous Uveitis

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Abstract: The mechanism of recurrent endogenous uveitis remains uncertain but it is generally believed to be affected by both heredity and environment. On January 17, 1995, the Hanshin-Awaji (Kobe) area of Japan experienced a major earthquake which killed more than 6300 people and forced 310 000 to take refuge in emergency shelters. All inhabitants of this area suffered severe stress due to the sudden changes in their living environment. We investigated the recurrence rate of endogenous uveitis before and after the earthquake in 116 patients who had been followed for more than 2 years (since July 17, 1993) at Kobe University Hospital. The postquake rate was significantly higher than the prequake rate (10% vs 3%); women were more often affected than men. Our data suggests that psychological stress due to the sudden changes in living conditions following the earthquake may have triggered the recurrences. It might be important to provide psychological as well as physical care for these patients after a disaster. **Jpn J Ophthalmol 1997; 41:111–114** © 1997 Japanese Ophthalmological Society

Key Words: Endogenous uveitis, environmental changes, Hanshin-Awaji earthquake, psychological stress.

Introduction

Many aspects of the etiology and recurrence of endogenous uveitis remain unexplained. One hypothesis is that the immunological balance of the host seems to be compromised by genetic or environmental factors.[1–3] Environmental factors include microbial infection, environmental pollution, and psychological stress.[4] No reports, however, have described the relationship between emotional stress and recurrences of endogenous uveitis. In the early morning (5:46 AM) of January 17, 1995, an earthquake with a magnitude of 7.2 on the Richter scale devastated the Hanshin and Awaji areas of Kobe in southern Hyogo Prefecture in Japan. This was also the first tremor ever recorded at 7.0 on the Japanese seismographic scale. More than 6300 people were killed; more than 43 000 were injured, some seriously. Over 420 000 houses and other buildings were damaged or destroyed and 310 000 people were forced to take refuge in emergency shelters. All vital utilities and infrastructure, including communications, power, gas, water, highways, railroads, and harbor facilities, were disrupted.[5] This great Hanshin–Awaji earthquake, known worldwide as the Kobe earthquake, brought drastic changes in people's lives; the severe psychological stress resulting from those changes was unfathomable. We evaluated recurrences in patients with endogenous uveitis who were being followed in our ophthalmology clinic at Kobe University Hospital.

Patients and Methods

The records of 223 endogenous uveitis patients who visited our ophthalmology clinic during the 6 months before and after the Kobe earthquake (July 17, 1994 through July 17, 1995) were statistically analyzed for the presence or absence of recurrences of inflammation.

Results

A total of 223 patients with endogenous uveitis (108 men; 115 women) visited our clinic between July 17, 1994 and July 17, 1995 (6 months before and after the earthquake disaster). Of these, 140 (68 men, 72 women) had been followed since July 17,

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1993. These 140 patients were studied for the number of visits before and after the earthquake. Four patients that did not visit during the 6 months immediately before the quake were not included in this study. One of those had been referred to another clinic and, therefore, only three patients (2% of those initially screened) ceased visiting during that time.

During the 6 months following the quake (from January 17 to July 17, 1995), 116 patients (62 men, 54 women) visited the clinic. Twenty patients (15%), five men (7% of the men) and 15 women (22% of the women), failed to visit during these first 6 postquake months. Statistically, this was a surge in the number of patients who failed to return during the 6 postquake months (chi-square test, $P < 0.001$).

In order to evaluate the impact of the disaster on the recurrence of endogenous uveitis, we clinically evaluated the presence or absence of recurrences according to the anterior segment and fundus findings of the 116 patients selected for the study. These patients were receiving the same therapy as before the earthquake. Uveitis had subsided in 109 patients within the 6 months before the quake; 11 of these (10%; three men, eight women) had a recurrence within 6 months following the event.

In the control group, we assumed that if the tremor had occurred 1 year earlier (January 17, 1994), three patients (one man, two women) of the 105 controls whose inflammation had subsided during the 6 months before that date would have had a recurrence during the 6 months following. This would be a recurrence rate of 3%, under normal conditions. The actual postquake rate increased within 6 months to 10%, a statistically significant increase (chi-square; $P < 0.05$). In the 116 study patients, three out of four who had an inflammation during the 6 prequake months also had a postquake recurrence; we eliminated these four frequently recurring cases from the study because it could not be determined if the later recurrence was related to the earthquake or not. We also eliminated three patients who could not be further evaluated because of invasive surgeries done during the follow-up period. (New total: 109.)

To examine more specifically the influence of the earthquake on recurrences, we studied the 14 patients in whom the uveitis had subsided during the 6 prequake months but recurred within 6 months following the quake (postquake recurrent cases). Eleven of these patients had been followed since July 17, 1993; three had been followed since July 17, 1994. The mean age of the postquake cases was 49.2 years; there were 11 women and three men. The recurrence was unilateral in 12 patients, bilateral in two. Recurrence occurred within 4 weeks in four patients; within 8 weeks in seven; and within 12 weeks in 12. The majority of postquake recurrences occurred within 3 months. The quiescent period ranged widely from 8 months to 12 years (mean = 3 years, 4 months).

Causes of the endogenous uveitis in these patients included Vogt-Koyanagi-Harada syndrome (three); Behçet's disease, sarcoidosis, toxoplasmosis, rheumatoid arthritis, herpetic iridocyclitis, Posner-Schlossman syndrome, and Fuchs heterochromic iridocyclitis (one each). In four cases, the cause was unknown. Three of 27 patients with Vogt-Koyanagi-Harada syndrome whose uveitis was quiescent during the 6 prequake months had a recurrence during the postquake period; one of the 28 with Behçet's disease, and one of the 15 with sarcoidosis also had similar recurrences. This was confirmed by examination of the anterior segment in all cases and the fundus in two (patients 1 and 10). Eleven of these patients lived in areas severely affected by the quake (recording a magnitude of 6.0 or more on the Japanese scale). Only three patients lived in Himeji, which was somewhat less seriously affected. Five patients had to move to temporary shelters or other areas. Six had to cope with the collapse of their homes or workplaces. All of these 11 were suddenly faced with extremely difficult living conditions following the disaster.

Discussion

The incidence of endogenous uveitis varies with race, geography, social environment, and time period,[6,7] yet many aspects of its etiology and recurrence remain unexplained. One hypothesis is that the immunological balance of the host is compromised by genetic or environmental factors.[1–3] Environmental factors include microbial infection, environmental pollution, and psychological stress.[4] For example, in Behçet's disease, the number of patients increased drastically in Japan in the 1950s, drawing special attention to the influence of environmental pollution during that period of high economic growth. We now recognize the correlation between increased copper levels in patients' serum and exacerbations of Behçet's disease.[8,9] Streptococci are also isolated from the patients' oral cavities and neutrophils are hyperactive.[10] In Vogt-Koyanagi-Harada syndrome, a high level of Epstein-Barr virus (EBV) DNA is found in the cerebrospinal fluid by the polymerase chain reaction (PCR) technique,[11] indicating that viral infection may be involved in its onset. However,

Table 1. Postquake Recurrence of Quiescent Endogenous Uveitis

Case	Age (y)/Sex	Site	Onset (After Quake)	Without Inflammation	Etiology	Kobe Area (magnitude)	Other
1	31/F	OD	2 wks	8 mo	Behçet	Chuo (7)	[c]
2	41/F	OU	2 wks	14 mo	V-K-H	Tarumi (6)	[a]
3	33/M	OS	3 wks	22 mo	Unknown	Nada (7)	[b]
4	52/F	OD	4 wks	46 mo	RA	Tarumi (6)	[b]
5	62/F	OS	5 wks	38 mo	V-K-H	Himeji (4)	
6	73/F	OS	7 wks	12 y	Sarcoid	Himeji (4)	
7	47/F	OD	8 wks	9 mo	Herpes	Hyogo (7)	[b]
8	64/F	OD	9 wks	14 mo	Unknown	Suma (7)	[a]
9	46/F	OS	10 wks	45 mo	Posner	Nagata (7)	[c]
10	49/M	OS	10 wks	46 mo	Toxo	Akashi (6)	
11	13/F	OS	11 wks	10 mo	Unknown	Awaji Is. (6)	[a]
12	69/F	OD	12 wks	10 y	Unknown	Suma (7)	[b]
13	63/F	OU	13 wks	15 mo	V-K-H	Himeji (4)	[b]
14	46/M	OS	18 wks	39 mo	Fuchs	Akashi (6)	[c]

Behçet: Behçet's disease. V-K-H: Vogt-Koyanagi-Harada syndrome. RA: rheumatoid arthritis. Sarcoid: Sarcoidosis. Herpes: herpetic iridocyclitis. Posner: Posner-Schlossman syndrome. Toxo: toxoplasmosis. Fuchs: Fuchs heterochromic iridocyclitis. Magnitude: Japanese scale.

[a] In temporary shelters.

[b] Collapse of residence or workplace.

[c] Moved away.

the mechanism of recurrent endogenous uveitis is still unclear: The cause may be an imbalance in the host–pathogen relationship, or the reentry of sensitized antigens.[2] An example of the latter appears to be one patient whose uniocular iritis recurs every year when he has an upper respiratory tract infection. But no reports have described psychological stress, one of the environmental factors, as an influence in the etiology or recurrence of endogenous uveitis.

The postquake recurrent uveitis rate remained at 10% for the 6-month postquake period. As we see in Table 1, women experienced more recurrences than men, suggesting that the sudden disruption of lifestyle had a greater psychological impact on women. This is consistent with a report suggesting that quake-induced psychological stress triggered acute myocardial infarction because of the larger number of such episodes, especially in women, following this Kobe earthquake than in the average year.[12]

Many disorders recur or are exacerbated by psychological stress, including atopic dermatitis and herpetic keratitis, which is closely related to herpetic iridocyclitis;[13,14] herpetic keratitis is also believed to involve environmental factors, such as psychological stress, resulting from the imbalance of the host–pathogen relationship.[14] A similar condition is believed to be involved in the etiology of the Posner-Schlossman syndrome in which PCR analysis has identified the herpes simplex virus.[15] Results of our study call attention to the influence of psychological stress resulting from sudden environmental changes, such as those that follow a disaster like the Kobe earthquake, in the recurrence of endogenous uveitis. This study indicates that psychological care is as important as physical care in these circumstances.

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