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Molecular Epidemiology of Group A Streptococci T Serotype 1

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Group A streptococcus (GAS) serotype T1/M1 has been commonly associated with streptococcal infections in Japan (1). Pulsed-field gel electrophoresis (PFGE) analysis of T1 isolates obtained from patients in Toyama Prefecture revealed that the PFGE pattern in 1987-1988 differed from that in 1991-1993 (2). Clonal changes of M1 strains on the basis of PFGE were also observed in the United States during the late 1980s (3) and in New Zealand during the early 1980s (4). In the present study, we examined the PFGE patterns of T1 GAS strains from four geographically distant areas in Japan during 1983-1998, with a view to clarify the communicability of the organisms.

A total of 308 T1 GAS isolates from patients without complications were examined. Smal PFGE analysis was performed by using CHEF-DRII (Bio-Rad Laboratories, Hercules, Calif., USA). Southern hybridization analysis was performed employing the Gene Images Random-Prime Labeling and Detection System (Amersham Pharmacia Biotech, Buckinghamshire, UK) using probes of PCR amplified speA (393 bp), speB (1,113 bp), and speC (540 bp).

Fourteen different PFGE patterns were found (Fig. 1). A computer-generated dendrogram revealed two large clusters, A and B (data not shown). Southern hybridization analysis also showed the clear difference between patterns A and B isolates (Fig. 2). The speA probe hybridized with none of the DNA fragments of the pattern A isolates but with a ~110 kb fragment of all the pattern B isolates. The speB probe hybridized with a ~160 kb fragment of all the pattern A isolates and a ~200 kb fragment of all the pattern B isolates except for pattern B3 isolate that showed a slightly larger hybridizing band. The speC probe hybridized with a DNA fragment of patterns A3, A7, and B2. Table 1 shows a common tendency in the three distant areas, Akita, Toyama, and Oita Prefectures, in which pattern A strains predominant before 1990 were gradually replaced by pattern B strains in 3 years from 1990 to 1992. The pattern A strains were present until 1990 in Akita and until 1992 in Toyama and Oita. The second prevalent strains, pattern B, were isolated in these three areas since 1990 but not before. All strains isolated in Okinawa Prefecture from 1991 belonged to pattern B. Among pattern A strains, either pattern A2 or A7 or both were dominant depending upon the area. Pattern B1 was dominant among pattern B strains in all the areas. Murase et al. (5) reported that PFGE patterns of T1/M1 strains isolated from patients with pharyngitis in Kanagawa Prefecture changed over 1988-1989, and that almost all strains showed dominant PFGE patterns from 1989 possessed the speA gene. All these findings indicate that the speA-positive clone of serotype T1/M1 GAS strains spread in Japan during 1989-1990 and replaced the speA-negative clone in various areas of Japan.
REFERENCES


