PREVALENCE OF ANTISTREPTOLYSIN O IN YOUNG PANAMANIANS

Arnold S. Monto, M.D.

ANTISTREPTOLYSIN O (ASO) titer have been suggested as a basis for comparing the past streptococcal experience of a population because of the simplicity and reproducibility of the determination (*1*). Its use circumvents variation from laboratory to laboratory in the efficacy of organism isolation and identification. Rantz and co-workers reported on differences in the prevalence of ASO antibody in serums collected in various sections of the United States. In keeping with the then accepted concept of low incidence of streptococcal infection in the southern States and the fact that rheumatic fever was infrequently observed in that region (*2*), the mean titers were lower in the parts of the country with warmer climates (*1*).

In the study of respiratory infections in Paraiso, Canal Zone, the frequency of antibody against a number of different viruses was shown to be similar to the pattern found in the Temperate Zone (*3*). Since in recent years it has become apparent that streptococcal disease and its complications can sometimes be a definite problem in tropical regions (*4*), it was of interest to look into the past experience of a Panamanian population with this infection. This report describes results of ASO determinations and compares the prevalence of antibody in various age groups with that reported in other parts of the world.

Materials and Methods

Blood samples were obtained by venipuncture from residents of all ages of Paraiso, Canal Zone. The village has been described in detail elsewhere (*3*). The inhabitants were all born in the tropics and were mainly of Panamanian nationality. Families were large and lived in somewhat crowded conditions. The climate was characterized by moderately elevated temperature year-round with high humidity throughout most of the year. As is typical for many areas in the tropics, the only major annual variation was in rainfall, but not in temperature. The health and sanitation standards maintained were similar to U.S. standards. The nearest settlement of U.S. citizens was Fort Clayton, 2 miles distant.

Serums were obtained from children and young adults within a 2-week period in January 1964, with all ages up to 29 years represented. They were divided into groups according to age. Twenty-five serums were randomly selected from each group and were tested for ASO titer with a commercial antigen (Difco Laboratories, Detroit, Mich.). End-points were determined in Todd units (*5*), and the test was controlled with the standard streptolysin reagent.

Results

Results of the ASO determinations obtained on blood samples of the 125 persons are given in the table. Geometric mean titers were calculated for each age group. These mean titers were most elevated in the 5- to 9- and 10- to 14-year age groups and then fell. The geometric means did not completely identify all the differences among the age groups. Almost half of those under age 5 had an antibody level of 12 Todd units or less. The titers in this group were not normally distributed, and the geo-

Dr. Monto was formerly with the Middle America Research Unit, National Institute of Allergy and Infectious Diseases, Public Health Service, in Balboa Heights, Canal Zone. He is now assistant professor of epidemiology, department of epidemiology and virus laboratory, University of Michigan School of Public Health, Ann Arbor.

metric mean was raised by the minority of children with the higher levels. Titers in the three other age groups below 20 years were distributed more normally, but covered a large range. In the young adults 20–29 years, the range of values narrowed while the mean titer dropped.

In view of the age-dependent variation in mean titers, it has proved impossible on unpaired serum specimens to set a generally applicable level which indicates a recent streptococcal infection. In young adults, 250 Todd units has been suggested as such a level (*1*); in this study, 16 percent of such persons did have antibody titers at or above this level. In the younger ages, peak titers were higher. Levels of 500 Todd units or higher were observed in 16 percent of those in the 5- to 9- and 15- to 19-year age groups and in 20 percent of the 10- to 14-year age group.

Discussion

The age-specific mean antistreptolysin titers in these Panamanians rose from low levels, peaked in the older children, and then fell. In spite of the differences in climate, a similar pattern has been observed in the North Temperate Zone (*1*). The explanation which has been offered for this pattern is the accumulation of a person's experiences with streptococcal antigens and then the decrease with age in the frequency of such infections (*6*). Mean antistreptolysin titers have been determined in serums of young adults living in various regions of the United States. A tendency for lower mean titers in persons from more southern regions was noted, but these differences were statistically significant only for certain extremes (*1*). The average titer in all serums of the American adults studied was 116 Todd units, a value which was actually lower than the 129-unit result obtained for persons of ages 20 to 29 in Panama. The levels found in children in the United States have also varied from place to place. The mean antibody titer in serums collected from San Francisco children of ages 5 to 12 years was much higher at 238 than the 102 units found in Miami children of ages 6 to 9 years (*1*, *7*). The mean titer for Panamanian children ages 5 to 9 was intermediate at 170 units.

Similar determinations have been made in other parts of the world, and variations have been found which could not be explained by climate alone. For Japanese adults, the geometric mean titer was 85 units (*8*). However, in serums collected from Maoris living in the Cook Islands of the South Pacific, antibody titers were extremely high, with more than half of those studied showing levels of 500 units or greater. Lower levels were found in serums from Maoris of New Zealand, while titers were still lower in serums of the residents of European ancestry. Lack of crowding and better hygienic conditions among the latter population was given as a reason for this difference (*9*).

Indication of this variation in streptococcal infection in various parts of the world can also be obtained from the relative extent of the carrier state, which again cannot be fully explained by climate. In the United States, no significant difference could be found in the overall carrier rate determined in Nashville (*10*) and the rates observed further south in subtropical Miami (*7*). In contrast, rates in both Hawaii and West Africa were very much lower (*11*, *12*). Although the group A streptococcal carrier rates in India were low, the isolation of group C and G organisms was much higher than would be expected in the United States (*13*).

Infections with such nongroup A streptococci would not explain the relatively frequent occurrence of rheumatic fever, only recently recognized in some portions of the tropics (*14*, *15*). Even if persons living there are more reactive and more prone to develop late complications of streptococcal infections, a minimal number of such group A infections must occur to explain the observed incidence of rheumatic fever. In addition, in the tropics, group A streptococcal infection often occurs outside the respiratory tract (*4*). Streptococcal wound infections have been reported as frequent in the Cook Islands (*9*) and have also been observed in Panama, according to a personal communication in 1964 from Dr. Mary Graham, division of preventive medicine, Canal Zone Health Bureau. Such nonrespiratory infections can be responsible in part for the level of ASO antibody found in these areas.

It is certain, however, that the relation of a warm climate to the incidence of streptococcal infection is not as simple as was once supposed.

Distribution of titers of antistreptolysin O in serums from Panamanians

Antistreptolysin titer (Todd units)	1–4 years		5–9 years		10–14 years		15–19 years		20–29 years	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Less than 12	4	16	0	0	0	0	1	4	0	0
12	8	32	1	4	1	4	1	4	0	0
50	4	16	2	8	2	8	4	16	5	20
100	1	4	2	8	3	12	3	12	3	12
125	3	12	5	20	2	8	2	8	4	16
166	3	12	4	16	6	24	5	20	9	36
250	2	8	7	28	6	24	3	12	3	12
333	0	0	0	0	0	0	2	8	0	0
500	0	0	2	8	3	12	2	8	1	4
625	0	0	1	4	1	4	2	8	0	0
833	0	0	1	4	1	4	0	0	0	0
Total	25	100	25	100	25	100	25	100	25	100
Geometric mean	76		170		178		137		129	

This concept is substantiated not only by the elevated ASO titer, but also by the frequent occurence of rheumatic fever and glomerulonephritis. While the detailed epidemiology of streptococcal disease in the tropics still needs to be worked out, it can be said, as with respiratory illness of viral etiology, that streptococcal infection does frequently occur and contributes to the public health problems of such areas.

Summary

Antistreptolysin O titers were determined for serum samples collected from persons born in the Panama area. All ages up to 29 years were represented in a group of 125 residents of Paraiso, Canal Zone. The age-specific mean titers rose to the highest levels (170 and 178) in the 5- to 9- and 10- to 14-year age groups and then fell to 129 Todd units in the 20- to 29-year-olds.

Mean titers for these young adults and children were actually higher than titers that have been reported for similar age groups in North America. Streptococcal infection must, therefore, be a commonplace occurrence in this tropical region, especially among the young.

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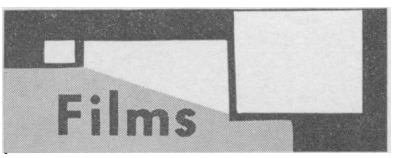

Getting Through. *Motion picture, 16 mm., black and white, sound, 20½ minutes, 1967. Order No. M–1520–X. Produced by Spectrum Associates for the National Clearinghouse for Smoking and Health, National Center for Chronic Disease Control, Public Health Service.*

AUDIENCE: Teenagers and young adults, teachers, youth workers, parents.

SUMMARY: In this film Burt Lancaster presents some of the troublesome questions about cigarette smoking. For example, why do young people smoke, knowing that it may cause physical disability or early death? And, who is responsible for seeing that young people don't pick up the habit? The film dramatizes the "smoky" world in which teenagers live. It explores cigarette smoking as a complex paradox in our society and concludes that the final decision about teenagers' smoking is not up to their parents, their teachers, the government, medical science, or the advertising business. It is ultimately a personal decision which each teenager must make after carefully weighing the facts.

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An Introduction to Nursing in a Coronary Care Unit. *Motion picture, 16 mm., color, sound, 26 minutes, 1967. Order No. M–1461. Produced by the National Medical Audiovisual Center for the Heart Disease Control Program, National Center for Chronic Disease Control, Public Health Service, in cooperation with the American Heart Association.*

AUDIENCE: Hospital and nursing personnel, student nurses.

SUMMARY: In a compact, specially designed coronary care unit, today's heart patients receive specialized nursing care supplemented by electronic monitoring devices which signal the possible need for corrective measures. Beside each patient's bed is an oscilloscope displaying such vital heart information as rhythm and rate. This information is displayed also on a monitor in the nursing station console. From the bedside or from the centralized console, the nurse can electronically monitor each patient and become alerted immediately to impending emergency situations. This recently developed method has enlarged the dimensions of care for heart patients during critical stages of their illness.

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Questions to Answer in Pathology. *Dr. Arnold Levene. Slide set with audiotape. A series of "spot" slides and specimens found in a surgical pathology laboratory. 34 minutes, 24 slides, 1967. Order No. S–1558–X.*

Hemoglobin. *Dr. Hermann Lehmann. Slide set with audiotape. Deals with the physiology and biochemistry of hemoglobin. 37 minutes, 22 slides, 1967. Order No. S–1559–X.*

Bowel Sounds. *Hugh Dudley. Audiotape. Recordings of bowel sounds with descriptive and explanatory comment. 17 minutes, 1963. Order No. A–1567–X.*

Disorders of Cardiac Rate and Rhythm. *Dr. J. McGuinness. Slide set with audiotape. Recording from the departments of medicine and of medical illustration, Western Infirmary, Glasgow. Origin and explanation of the various disorders, and their EKG appearances. 35 minutes, 47 slides, 1966. Order No. S–1560–X.*

The Acutely Ill Baby. *Dr. Simon Yudkin. Slide set with audiotape. An analysis of a consecutive series of cases admitted to the Whittington Hospital; which conditions are most commonly seen; problems is diagnosis. 22 minutes, 9 slides, 1962. Order No. S–1561–X.*

Acute Renal Failure. *Dr. A. Linton. Slide set with audiotape. Recording from the departments of medicine and of medical illustration, Western Infirmary, Glasgow. Definition, causes, diagnosis, treatment. 43 minutes, 21 slides, 1966. Order No. S–1562–X.*

Headaches. *Prof. Henry Miller. Audiotape. A general discussion on etiology, diagnosis, and treatment, with particular reference to migraine, cranial arteritis and migrainous neuralgia. 33 minutes, 1964. Order No. A–1565–X.*

Allergy. *Dr. A. W. Frankland. Audiotape. Definition; prognosis; the allergic response, immediate and delayed; antigens; discussion. 31 minutes, 1964. Order No. A–1566–X.*

All slides and audiotapes listed were produced by Drs. John and Valerie Graves of the Royal College of General Practitioners, Medical Recording Service and Sound Library, Chelmsford, Essex, England. Audiotapes are recorded 3¾ ips, full track, 5-inch reels.

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