

Preliminary Study on Acute Rheumatic Fever at High and Low Altitudes of Asir Region

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هدف البحث : دراسة الحمى الروماتيزمية الحادة في الأماكن المرتفعة (معتدلة المناخ) والأماكن المنخفضة (الحارة) .

طريقة البحث : تم دراسة ٢٨ طفلاً شخصوا بإصابة أولية من الحمى الروماتيزمية ما بين شهر نوفمبر ١٩٨٧م وشهر يوليو ١٩٩٥م .

نتائج البحث : أظهرت الدراسة أن سبعة وعشرين طفلاً كانوا يقطنون المرتفعات (المجموعة ١) بينما كان الباقون يقطنون الأراضي المنخفضة في تهامة (المجموعة ٢) ، ضمن هؤلاء ٢٢ كانوا من الذكور و١٦ من الإناث ، ومتوسط العمر هو ٩.٧ سنوات . مرض التهاب المفاصل هو الصورة الأكثر شيوعاً بنسبة ٨٦.٨٪ ومرض التهاب القلب بنسبة ٦٨.٤٪ يأتي في المرتبة الثانية ، وقد حدث عجز الصمام التاجي بنسبة ٩٦.٢٪ عند المصابين بالتهاب القلب ، وعجز الصمام الأورطي بنسبة ١٩.٢٪ وعجز الصمام الثلاثي بنسبة ٧.٧٪ أما تضيق الصمام المترالي والأورطي فلم يحدث أي منهم على الإطلاق . ولقد أوضحت المقارنة بين المجموعة ١ والمجموعة ٢ أن نسبة حدوث مرض التهاب القلب هي ٦٦.٧٪ و٧٢.٧٪ على التوالي وأن نسبة حدوثه بصورة شديدة في المصابين هي ٢٧.٨٪ و٢٥٪ على التوالي . إن مرض الزفن والحمامي الهامشية وتضخم العقد للمفاوية تحت الجلد ليست شائعة في المنطقة .

الاستنتاجات : إن هذه الدراسة تستنتج بأن مدى ارتفاع المناطق والمناخ ربما ليس لهما تأثير في نسبة حدوث التهاب القلب أو شدته .

مفاتيح الكلمات : الحمى الروماتيزمية الحادة ، التهاب القلب ، المناطق المرتفعة ، عسير .

Objective : The objective was to study the profile of acute rheumatic fever (ARF) at high and low altitudes (hot and temperate areas respectively) with particular attention to the influence of these differences on the frequency or severity of carditis.

Methodolgy : Thirty eight children with initial attack of ARF, diagnosed between November 1987 and July 1995, were studied.

Result: Twenty seven were living at altitude, temperate climate (group-1) while 11 were living at low altitudes of Tihama, hot climate (group-2). Twenty two were males and 16 were females. The mean age was 9.7 years. Arthritis was the commonest feature (86.8%) and carditis (68.4%) came second. Mitral regurgitation occurred in 96.2% of those with carditis,

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aortic regurgitation occurred in 19.2% and tricuspid regurgitation in 7.7%. Mitral stenosis and aortic stenosis were not encountered. A comparison between group-1 and group-2 showed the frequency of carditis to be 66.7% and 72.7% respectively and the frequency of severe carditis in those affected to be 27.8% and 25% respectively. Chorea, erythema marginatum and subcutaneous nodules were uncommon.

Conclusion: The study indicates that altitude and climate may not affect the frequency nor severity of carditis.

Key Words : Acute rheumatic fever, carditis, altitude, Asir.

INTRODUCTION

Acute rheumatic fever (ARF) is a serious public health problem in the developing countries.¹⁻³ It has shown little if any decline in many of these countries, in contrast to the significant decline in the developed countries with the exception of several recent outbreaks in the United States.^{4,5} It has been argued that ARF has a more fulminant course in the developing countries and its profile differs from that in temperate areas.^{6,7}

The varied topography of Asir province, i.e. an altitude of 3000 m in Abha with temperate climate (temperature range : 5-28°C)⁸ and that of the low altitudes of Tihama areas with hot climate (temperature range : 25 - 45°C)⁸ provided an opportunity to compare the epidemiological and clinical aspects of the disease in these different altitudes and climates.

MATERIALS AND METHODS

The medical records of children aged less than 18 years who were diagnosed between November 1987 and July 1995 at Asir Central Hospital as having first attack of ARF were reviewed. The diagnosis of ARF was based on revised Jones criteria.⁹

Demographic, medical and laboratory data were obtained in each case. Complete blood count (CBC), erythrocyte sedimentation rate (ESR) using Westergren method, antistreptolysin O (ASO) titer using Latex agglutination test and throat swab culture were done in all patients. All patients had chest X-ray and electrocardiogram and the

presence of carditis was confirmed using two-dimensional and Doppler echocardiography. Carditis was considered mild in absence of cardiomegaly, moderate in presence of mild to moderate cardiomegaly and severe in presence of severe cardiomegaly or overt congestive heart failure.

A comparison between the profile of ARF in children living at high altitudes and children living at low altitudes was made with particular attention to the frequency and severity of carditis.

RESULTS

Thirty eight patients were studied. Twenty two were males and 16 were females with male to female ratio 1.4:1. Their ages ranged from 4 to 12 years (mean age 9.7 years). Affected children living at high altitudes were 27 (group-1) and those at low areas were 11 (group-2). The mean age was 9.6 year and male to female ratio was 2:1 for group-1 while group-2 had a mean age of 9.6 year and male to female ratio 0.6:1. The average family size was 9.7 considering all patients; 10 for group-1 and 9 for group-2. Fifteen of the cases (55.6%) occurred during late autumn and winter in group-1, while nine of the cases (81.8%) occurred during late spring and summer in group-2.

A history of upper respiratory tract infection few weeks before the onset of ARF was positive in 22 cases (57.9%). Throat swab culture was positive for group A beta-hemolytic streptococci in one patient only (2.6%).

Arthritis was the most common presenting feature; it occurred in 33 patients (86.8%). It was

polyarticular in 84.8% and monoarticular in the remainder. Fever (temperature $\geq 38^{\circ}\text{C}$) occurred in 25 patients (65.8%).

Carditis occurred in 26 patients (68.4%). Mitral valve regurgitation was the most common lesion and occurred in 25 patients (96.2%) of those with rheumatic carditis. Aortic valve regurgitation occurred in five patients (19.2%) and significant tricuspid valve regurgitation was present in two patients (7.7%). Mitral stenosis, aortic stenosis and pulmonary valve involvement were not documented. Pericarditis with or without effusion occurred in four patients (15.4%). Carditis was moderate/severe in seven of them (26.9%). No fatality occurred.

Chorea occurred in two patients (5.3%), erythema marginatum in two and subcutaneous nodules in one patient (2.6%).

The profile of ARF in the two groups is shown in Table 1. Carditis occurred in 18 patients (66.7%) of group-1 and was moderate/severe in five (27.8%) of them, while it occurred in eight patients (72.7%) of group-2 and was moderate/severe in two (25%) of them. The overall frequency of moderate/severe carditis was 18.4% (7 out of 38). Arthritis was present in 24 (88.9%) of group-1 and in nine (81.8%) of group-2.

Table 1

Profile of acute rheumatic fever at high altitude (temperate climate) (group1) and low altitude (hot climate) (group-2)

| Features | Group-1 n (%) Total 27 | Group-2 n (%) Total 11 |
|----------------------|------------------------------|------------------------------|
| Mean age | 9.6 years | 9.6 years |
| Male:Female | 2:1 | 0.6:1 |
| Mean family size | 10 | 9 |
| Arthritis | 24(88.9) | 9 (81.8) |
| Carditis | 18 (66.7) | 8 (72.7) |
| Moderate/Severe | 5/18 (27.8) | 2/8 (25%) |
| Chorea | 1 (3.7) | 1 (9.1) |
| Erythema marginatum | 2 (7.4) | 0 |
| Subcutaneous nodules | 1 (3.7) | 0 |

ASO titer was elevated (≥ 300 iu/ml) in 76.3% of all patients and the ESR was ≥ 30 mm/hr in 97.4% of them. Thrombocytosis and leukocytosis were present in 28.9% and 26.3% respectively. Thrombocytopenia or leukopenia was not encountered.

DISCUSSION

The age and sex distribution in this study are comparable to those from Riyadh.¹⁰ The peak incidence of ARF at altitudes was during winter which is comparable to the findings in Riyadh¹⁰ while the peak incidence at low altitudes was in late spring and summer. The importance of crowding as a contributory factor in the development of ARF may be implied by the large average family size of the patients in this series.

Arthritis was the most common feature (86.8%). The frequency of carditis was 68.4% which is higher than previously reported incidence (43%) in Riyadh series¹⁰ but close to what has been reported from other countries.^{5,11} Mitral valve regurgitation was the most common cardiac lesion which is in agreement with the finding in other studies.^{10,11} Mitral valve stenosis was not encountered and this may reflect the mild nature of the initial attack of ARF in Saudi Arabia as previously reported.¹⁰ The syndrome of juvenile mitral stenosis which affects people under the age of 20 years^{12,13} may be rare in Saudi Arabia.

The frequency of carditis in ARF at high and low altitudes was similar (66.7% vs 72.7%). Furthermore the frequency of moderate/severe carditis was also similar (27.8% vs 25%). Although the sample is small to draw a solid conclusion, this preliminary study may indicate that the profile of ARF in general and the frequency and severity of carditis in particular are similar in high altitude areas with temperate climate and in low altitude areas with hot climate. These findings are in contrast with those from some tropical countries^{6,7} where the incidence of carditis has been considerably higher, and similar to those from United States (59%).⁵ Okorama et al⁶ reported the incidence of carditis to be 98.5% in Nigerian children. The frequency of

moderate/severe carditis in this study (18.4%) is similar to that reported from Riyadh and Kuwait,^{10,11} 15.7% and 14% respectively.

The apparently high incidence of carditis in studies from some tropical countries was attributed to a biased sample as in poor countries only severe cases are brought to medical care and also to the inclusion of cases affected by recurrent attacks of ARF¹⁴ where carditis tends to be worse than during initial attacks.

The finding of low incidence of chorea (5.3%) in this series is in contrast with the findings in studies from some tropical countries.¹⁴ A high incidence of chorea was reported from Pakistan, 29% and from the United States, 30%.⁵ Erythema marginatum and subcutaneous nodules were uncommon features in this series.

In conclusion, this study demonstrates that the profile of ARF in this area is similar to that in western countries, and there may be no difference in the frequency and severity of carditis between the high areas (temperate climate) and low areas (hot climate) of Asir region, and this may indicate that climate and altitude have no direct effect on the severity of ARF once it occurs. A further study, including a larger number of patients is needed to confirm these findings.

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