Rheumatic fever: clinical profile of the initial attack in India

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The clinical profile of acute rheumatic fever in developing countries is frequently reported to differ from that in developed countries. This probably arose because a distinction was not made between the manifestations of the initial attack and those of a recurrence. Here, we report the patterns of presentation and clinical features of 100 cases of carefully determined initial attacks of rheumatic fever. As many as half the patients had carditis, and, of these, 50% exhibited congestive cardiac failure. This high incidence arises because in developing countries with limited health-care facilities patients continue to be physically active during the long pre-admission period. The study confirms that the clinical profile of the initial attack of rheumatic fever in developing countries is in most respects not unlike that in developed countries.

Although it has been reported that rheumatic heart disease is the commonest type of cardiovascular disorder in India (1–3), no clear clinical picture of acute rheumatic fever in the country has been described. The frequency of severe manifestations reported range from low (1) to high (4, 5). This variation probably arose because no distinction was made between the clinical features of the initial attack and those of recurrences. With each successive recurrence, the heart disease becomes more extensive (6, 7). Furthermore, in developing countries, the long journey to the hospital is usually undertaken when the patient develops disabling symptoms, such as congestive heart failure in the case of rheumatic fever; arthritis and arthralgia by themselves often receive indigenous treatment.

A prospective study of the clinical profile of the initial attack of acute rheumatic fever in Delhi indicated, for the first time, that the manifestations of the disease are the same as those in developed countries (8); however, there has been no other report from a developing country that has refuted or confirmed these observations. We describe here the results of a study to define the clinical profile of the initial attack of rheumatic fever in an economically deprived area of India where medical-care facilities are poor.

Materials and Methods

The study was conducted from January 1980 to February 1983, and involved 100 children and adolescents admitted consecutively to M.L. N. Medical College Hospital, Allahabad, with an initial attack of acute rheumatic fever. This hospital is located in eastern Uttar Pradesh, an economically deprived region, and caters for patients from both urban and rural areas.

Diagnosis was based on the revised Jones criteria (9). A small proportion of active cases other than chorea had low or borderline antistreptolysin O (ASO) titres. In such cases, additional streptococcal antibody tests are usually employed to confirm past throat infections; however, since the hospital lacked facilities to perform these tests, we excluded from the study all subjects who appeared clinically to have rheumatic fever but who did not show a sufficiently raised ASO titre to permit unequivocal diagnosis.

To further ensure that only patients with an initial attack of rheumatic fever were included, we used the following selection criteria:

— no past history of joint pains or swelling, abnormal limb movements, or heart murmur;
— duration of symptoms not more than 3 months before admission to the hospital;
— only patients aged below 15 years.

Patients with physical signs of established mitral stenosis had probably had an overt or covert attack of rheumatic fever in the past and were therefore also excluded from the study.
The history of each case was recorded, including, as precisely as could be determined, the time of onset and nature of the symptoms, the order in which they developed, and the duration of any period of bed rest. The information obtained was frequently cross-checked by interviewing an attendant of the patient. Any medical record or history of illness in the past was carefully scrutinized to confirm whether the rheumatic fever was an initial attack.

Patients were examined physically on admission and also subsequently, paying particular attention to heart murmurs, pericardial friction, subcutaneous nodules, erythema marginatum, signs of congestive heart failure, and the sites of joint pains and swellings. Carditis was diagnosed using standard clinical criteria.

All patients underwent the following tests or investigations: determination of ASO titre, chest X-ray, erythrocyte sedimentation rate, throat swab culture, white cell count, and electrocardiogram. A P-R index, defined as the ratio of the measured P-R interval to the maximum P-R interval for an individual of that age and heart rate, was determined for each patient. Values of this ratio greater than 1 were taken to be abnormal.

RESULTS

Of the 100 patients in the study 58 were boys and 42 girls. The youngest patient was 6 years of age, and the mean duration of symptoms before admission to hospital was 6.47 ± 3.04 weeks.

Patterns of presentation

Febrile arthritis was the most frequent presentation (68% of patients), and for nine of these patients the predominant symptom was due to congestive heart failure. Sixteen others exhibited abnormal movements, with or without involvement of joint symptoms, while a further 12 patients had only arthralgia; most of these patients sought admission for the disabling symptoms of congestive heart failure. Finally, three patients were admitted who exhibited the clinical features of congestive heart failure without any extracardiac manifestation, and one patient with fever alone was discovered to have carditis. Although 26 patients had congestive heart failure, its symptoms were predominant only in 17.

Clinical features

Joint manifestations. Some patients with arthritis exhibited either one or more swollen joints for the entire course of the disease, while for others the swelling waxed and waned before treatment. Swelling remained confined to one joint for five patients, while polyarticular or migratory arthritis was observed in 63 others. The degree of inflammation of the initially affected joint did not always decrease as other joints became involved. Most frequently, the joints affected were knees, ankles, and elbows, but for three patients the interphalangeal joints were involved, while for two others, the hip joints were implicated. Four patients also complained of backache, while one had swelling of the sternoclavicular joint. Of the 68 patients with arthritis, 31 had carditis, 13 of whom displayed clinical features of congestive heart failure. For seven of the 68 patients fever was not a significant symptom before admission or during observation. All 12 patients with arthralgia had carditis, and ten of them were admitted with symptoms of congestive heart failure.

Carditis. Carditis was observed in 51 patients (Table 1), and of these 26 had congestive heart failure and cardiomegaly. A further seven patients had pericarditis, three of whom did not develop congestive heart failure during observation. Children who did not have carditis were admitted, on average, 5.0 ± 4.03 weeks after onset of illness, while for those with uncomplicated carditis this period was 5.95 ± 5.26 weeks. The comparable period before admission was 9.4 ± 4.2 weeks for patients who presented with frank symptoms of congestive heart failure. The correlation coefficient between the duration of symptoms and severity of disease was 0.267 (P<0.05). All patients had mitral regurgitation, and for 11 a gentle, apical, mid-diastolic murmur (Carey-Coombs) was also present on auscultation. An aortic diastolic murmur was also identified in a further three patients. The incidence of carditis associated with the dominant manifestations is shown in Table 1.

Most of the patients studied had taken no bed rest prior to hospitalization, except for short periods when the arthritic joints involved the lower limbs and the symptoms were disabling. This was true also of patients with carditis, who were brought to hospital when one or more symptoms of congestive heart failure developed, i.e., breathlessness, cough, palpitation with discomfort in the right upper abdomen, or oedema of the feet. Chest pain caused by pericarditis was not a prominent symptom and, after questioning, was admitted only by three of the seven patients with this complication. A P-R index >1 was recorded on admission for 14 patients with carditis and for three who had no evidence of carditis.

Chorea. Sixteen children (9 female, 7 male) had chorea. Of these, 10 had uncomplicated chorea, while four exhibited carditis concurrently. Chorea was
Table 1. Incidence of carditis with dominant manifestations and subcutaneous nodules

<table>
<thead>
<tr>
<th>Dominant manifestation</th>
<th>No. of patients</th>
<th>% of total</th>
<th>% of manifestation</th>
<th>% of total</th>
<th>% of manifestation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arthritis</td>
<td>68</td>
<td>31</td>
<td>45.5</td>
<td>37</td>
<td>54.5</td>
</tr>
<tr>
<td>Arthralgia</td>
<td>12</td>
<td>12</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Chorea</td>
<td>16</td>
<td>4</td>
<td>25</td>
<td>12</td>
<td>75</td>
</tr>
<tr>
<td>Fever alone</td>
<td>1</td>
<td>1</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>97*</td>
<td>48*</td>
<td>49</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Subcutaneous nodules   | 5              | 2          | 40                 | 3          | 60                 |

* Three cases had carditis with congestive heart failure without any other manifestation.

Associated with arthritis in two patients (one of whom displayed symptoms characteristic of carditis) and with arthralgia in one other.

**Subcutaneous nodules.** Subcutaneous nodules were detected in five patients but only two had carditis (severe in one). The remaining three patients had febrile arthritis. With the exception of one nodule, which had a diameter of 1 cm, the others were small (diameter 3–5 mm). For two patients, the diagnosis was confirmed by biopsy (Fig. 1).

**Other features.** No example of erythema marginatum was observed in the study group. Four patients developed epistaxis during the course of the disease. All patients had ASO titres in the range 250–1250 units, except those with chorea on its own (titre range: 100–333 units). Throat swab cultures from 11 patients were positive for group A streptococcus.

**Mortality**

Two patients in the study died; both were admitted with congestive heart failure, which did not respond to anticongestive treatment or corticosteroids. Neither of them had nodules or a prolonged P–R interval, but one exhibited pericarditis, while the other had a paroxysmal episode of atrial fibrillation.

**DISCUSSION**

The clinical profile of acute rheumatic fever in India (3, 4, 10) and other developing countries (11–13) has been alleged to differ in three principal respects from that observed in developed countries. Firstly, in developing countries, particularly in the tropics, the disease is more severe, as evidenced by the high prevalence of carditis, congestive heart failure, and mortality. Secondly, in developing countries erythema marginatum is probably never observed, while subcutaneous nodules and chorea are uncommon (4, 14, 15). Finally, polyarthritis, the remaining major manifestation of Jones criteria, often occurs in developing countries as migratory arthralgia and not as objective swelling of the joints (16).

For positive diagnosis of rheumatic fever, at least one of the major manifestations of Jones criteria has to occur, which, in view of the observations on the patients discussed in the preceding paragraph, may only be carditis. If the patient has an established valvular lesion or unknown cardiac status, rheumatic fever is not likely to be diagnosed in some cases unless the less common pericarditis develops. It has there-

![Fig. 1. Subcutaneous nodule showing palisading epithelioid cells around the necrotic area. Haematoxylin and eosin stain (× 80).](image-url)
fore been suggested that the presence of the triad of symptoms—joint pains, elevated erythrocyte sedimentation rate, and an ASO titre of $\geq 400$ units—should be used as the major criterion for diagnosing rheumatic fever in India (16, 17).

A study of rheumatic fever in Delhi in 1974 (8) reported that arthritis was the most frequent finding in the initial episode of rheumatic fever and that carditis had a lower incidence, while erythema marginatum, subcutaneous nodules, and chorea were also observed. It was therefore concluded that the higher incidence of carditis reported in previous Indian studies probably arose because of inclusion of patients with recurrences and that the clinical profile of rheumatic fever in India does not differ significantly from that in developed countries. It therefore appears that the alleged differences between the symptoms of rheumatic fever in developing and developed countries are fallacious, since not only recurrences but also prolonged physical activity prior to hospitalization increase mortality from the disease as well as the incidence and severity of carditis (18). The incidence of carditis (51%) and congestive heart failure (51% of cases of carditis) in our study was higher than that reported in metropolitan Delhi (8), since patients with congestive heart failure in our study remained physically active for a longer time and were admitted to hospital a longer interval after the onset of symptoms than either those with uncomplicated carditis or no carditis.

The severity of swollen joints may vary during the course of rheumatic fever (19). For considerable periods the main complaint may only be joint pains, and, if the period of observation is short or the history not accurately given, the patient may only be diagnosed as having minor arthralgia. Almost the same proportion of patients in our study had arthritis as had those in the study in Delhi (8).

The principal manifestations of the initial attack of rheumatic fever in India are contrasted in Table 2 with those in developed countries. Caution should, nevertheless, be exercised in making comparisons, since certain manifestations of rheumatic fever exhibit a marked tendency to vary with time. For example, both the frequency and severity of carditis and the frequency of chorea have declined substantially in developed countries over the last few decades (7, 21). The reported incidence of chorea in some studies of rheumatic fever in India is lower than that found here and in Delhi (8), but is similar to the level recorded in developed countries in the past. Also, in early studies subcutaneous nodules were practically always associated with carditis (14, 20), but today both the frequency and size of nodules associated with rheumatic fever have declined; in our study less than half the patients with subcutaneous nodules exhibited carditis.

<table>
<thead>
<tr>
<th>Table 2. Incidence of principal manifestations of initial attack of acute rheumatic fever</th>
<th>Percentage incidence during the period*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total no. of cases</td>
<td>490</td>
</tr>
<tr>
<td>Manifestation</td>
<td></td>
</tr>
<tr>
<td>Arthritis</td>
<td>58</td>
</tr>
<tr>
<td>(with carditis)</td>
<td></td>
</tr>
<tr>
<td>Carditis</td>
<td>53</td>
</tr>
<tr>
<td>(pericarditis)</td>
<td></td>
</tr>
<tr>
<td>(congestive heart failure)</td>
<td>(12)</td>
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<tr>
<td>(15)</td>
<td>(13.9)</td>
</tr>
<tr>
<td>Chorea</td>
<td>19</td>
</tr>
<tr>
<td>(with carditis)</td>
<td>(30)</td>
</tr>
<tr>
<td>Subcutaneous nodules</td>
<td>12</td>
</tr>
<tr>
<td>(with carditis)</td>
<td>(91)</td>
</tr>
<tr>
<td>Erythema marginatum</td>
<td>11</td>
</tr>
<tr>
<td>(with carditis)</td>
<td>(69)</td>
</tr>
<tr>
<td>Arthralgia</td>
<td></td>
</tr>
<tr>
<td>(with carditis)</td>
<td>9</td>
</tr>
<tr>
<td>Mortality (%)</td>
<td>1.6*</td>
</tr>
</tbody>
</table>

* Figures in parentheses represent the percentage of individuals with the complication.

* In the first series of 304 cases only.
Attention has previously been drawn to the inverse relationship between the severity of cardiac involvement and that of joint symptoms in cases of rheumatic fever (20). In our study, 12 patients with arthralgia exhibited carditis, which for 10 deteriorated to congestive heart failure. Indeed, had it not been for the incapacitating symptoms of heart failure, some of these patients would not have presented to the hospital. It should also be stated that rheumatic heart disease in the tropics differs considerably from that in developed countries in terms of the prevalence of “juvenile mitral stenosis”; however, this is a sequela of rheumatic fever. In conclusion, the diagnostic features of rheumatic fever are practically the same in both developing and developed countries. The prevalence of some manifestations, such as carditis, subcutaneous nodules, and erythema marginatum, have declined for reasons that are not clear. Poverty, ignorance, and inadequate availability or use of medical-care facilities in developing countries may not only increase the prevalence of rheumatic fever but also compound the incidence of complications such as carditis.

RÉSUMÉ

RHUMATISME ARTICULAIRE AIGU. PROFIL CLINIQUE DE LA PREMIÈRE ATTEINTE EN INDE

On a souvent rapporté que le profil clinique du rhumatisme articulaire aigu diffèrent entre les pays en développement et les pays développés. Cela tient sans doute à ce que l’on ne faisait pas de distinction entre les manifestations de la première crise et celles d’une récidive. Les motifs de consultation et les caractéristiques cliniques de 100 cas consécutifs, rigoureusement attestés, de première atteinte de rhumatisme articulaire aigu admis dans un hôpital d’Allahabad sont décrits ici. Les malades présentaient le plus souvent une arthrite fébrile (68%); venait ensuite les mouvements choréiques (16%), et l’arthralgie (12%). La moitié des malades présentaient une cardite et parmi ceux-ci, 50% une insuffisance cardiaque. Cinq malades avaient des nodosités sous-cutanées mais aucun cas d’erythème marginé n’a été observé. Tous les malades arthralgiques étaient atteints de cardite et la plupart souffraient d’insuffisance cardiaque. Deux malades sont décédés. L’intervalle entre l’apparition des symptômes et l’admission à l’hôpital a été en moyenne de 5 semaines pour les sujets indemnes de cardite, de 5,95 semaines pour ceux ayant une cardite non compliquée, et de 9,4 semaines pour les malades atteints d’insuffisance cardiaque.

Dans les pays en développement où les services de santé sont limités, la forte incidence des cardiites consécutives à un rhumatisme articulaire aigu vient de ce qu’au cours de la longue période précédant l’admission, les malades continuaient à être physiquement actifs. Nos observations corroborent également la relation inverse qui existe entre l’atteinte cardiaque et la gravité des symptômes articulaires. Cette étude confirme que, pour l’essentiel, le profil clinique de la première crise de rhumatisme articulaire aigu dans les pays en développement ne diffère guère de celui observé dans les pays développés.

ACKNOWLEDGEMENTS

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REFERENCES

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