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CARDIOVASCULAR DISEASES IN THE TROPICS. A GEOGRAPHICAL PATHOLOGIST'S OVERVIEW.

Only in recent decades has it become possible to evaluate the importance of cardiovascular diseases. It is difficult to obtain trustworthy data from the tropical regions, which is practically limited to certain localities. Rheumatic disease is still considered the foremost cause of heart disease in persons under 40 years of age, with a especially high incidence in tropical and subtropical regions. The increasing incidence of ischaemic heart disease is very evident, mainly in rapidly modernizing societies. Despite the universal nature of endomyocardial fibrosis, it is endemic to the tropics. There is also a high incidence of idiopathic heart failure (congestive heart disease). The association to parasitic infections is discussed.

The overall pattern of disease and the incidence, morbidity and mortality of specific diseases in any population are determined by the interplay of environmental factors and the genetic background of the people. Studies on immigrant groups suggest that the environment in its overall context is the main determinant of disease in any particular country, though at the individual level, there is increasing recognition that genetic make-up, expressed for example by HL-A type, may be important in the development of some diseases in particular individuals exposed to similar exogenous influences. Environmental influences act from foetal life to old age and include all factors related to the place in which we live, our socioeconomic status and our cultural background. Even within highly developed and urbanized countries it is becoming apparent that socioeconomic factors, which are often linked with particular cultural patterns such as diet, may lead to variations in the incidence of disease between different towns.

The tropics, defined as that part of the earth's surface area lying between 23°27 north or south of the equator, while sharing this geographical definition contain populations living in many different environmental situations determined by local geography, socioeconomic and cultural factors and history. In a study of heart disease in these regions, poverty is probably the dominant factor in the disease pattern and the well-off, upper class groups

of whatever race tend eventually to develop a more 'western' pattern of cardiovascular disease.

It is only in the last 40 years that information has become available about cardiovascular disease in the populations tropical and sub-tropic countries. Prior to the Second World War, medical services tended to concentrate in the large cities serving mainly European populations or, in the rural areas, to be overwhelmed by the major epidemic diseases such as malaria, trypanosomiasis (African and South American), leprosy, schistosomiasis and onchocerciasis.

In a brief overview of cardiovascular disease in the tropics one is conscious that information is still patchy and often inadequate, that patterns of disease may vary greatly between and within different tropical countries and that these patterns are changing as countries develop or, in some cases, become poorer. For these reasons some of the observations that follow about the prevalence or mortality of specific cardiovascular disease must be accepted as generalisations for which there will inevitably be exceptions.

Throughout much of the tropical world the foremost causes of cardiovascular mortality are rheumatic heart disease and hypertension while conversely ischaemic heart disease is uncommon or rare.

Rheumatic heart disease (RHD) - While the incidence of acute rheumatic fever and chronic rheumatic heart disease has fallen dramatically in most western countries, they are widespread in the tropics. It is said to be

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the most common cause of heart disease in the world in people up to 40 years and this is mainly due to the high incidence in the tropics and subtropics. The clinicopathological features of rheumatic heart disease are similar to those seen in Europe in the early part of this century, though chorea and classical acute rheumatic arthritis appear to be less common in many tropical areas. Acute rheumatic carditis is an important cause of congestive cardiac failure in children and chronic, established valvular lesions may be present in the early teens. Those countries in which development has proceeded apace in the last 30 years are recording a decline in incidence confirming the importance of socioeconomic factors in this condition.

Hypertension - Scattered throughout the tropics and subtropics there are a few isolated, 'underdeveloped' societies who do not show rise of blood pressure with age which is characteristic of most of the world populations. Changes in the environment of such groups, most easily studied in immigrant groups, lead to a reversion to the 'normal' rise with age of other populations. There is some evidence that the flat blood pressure profile is associated with a low intake of salt and it is of interest that differences in salt-handling in individuals have been shown to occur in hypertensives within populations. Apart from these isolated groups, hypertensive heart disease is an important cause of cardiovascular morbidity and mortality in most tropical areas with a tendency to be higher in urbanizing societies. It is of interest that American blacks, of original West African extraction, have higher mean blood pressure levels than American Whites. This may reflect both environmental and genetic influences. In many parts of the Tropics there is a high incidence of chronic renal disease, usually due to chronic glomerulonephritis. In such areas hypertension in the under 30's is frequently of renal origin.

Ischaemic heart disease - Throughout most of the rural areas of the Tropics, at least in the lower socioeconomic groups, clinical ischaemic heart disease is uncommon or even rare. However in the upper socioeconomic groups, particularly in those countries which have been exposed to increasing western influences, IHD is increasing quite rapidly. Necropsy studies in populations have shown quantitatively low amounts of atheroma affecting the coronary arteries and the aorta, and predisposing conditions such as hypertension or diabetes mellitus do not greatly increase the quantity of such lesions. Even so, atherosclerosis does occur in the elderly groups and it is likely that the low incidence of clinical IHD is due not only to the low prevalence of atheroma, but also to a lower thrombotic tendency in these populations. The bulk of evidence suggests that dietary factors are of paramount importance in determining the frequency of IHD in specific populations and the mean level of serum cholesterol is the best indicator of mortality from IHD between populations.

Endomyocardial fibrosis (EMF) - The clinicopathological features of EMF are characteristic and the condition can be differentiated from congenital fibro-

elastosis of the heart and non-specific scarring that may follow various forms of myocarditis or ischaemia. EMF is seen sporadically throughout the world (Löfller's syndrome or endocarditis) and is characteristically associated with a concurrent eosinophilia. Endemic EMF, first described in detail by Davies in Uganda, is similar clinically and pathologically, but has a much higher incidence in certain tropical areas. The highest rates are reported from Uganda, where it is the third commonest cause of cardiovascular mortality. The condition is also endemic throughout sub-Saharan Africa but is rare south of the Zambezi river and in South Africa. EMF is also endemic in Southern India, Sri Lanka, parts of Brazil and Colombia, South America. Although there is some evidence that the pathogenesis of sporadic and endemic EMF may be similar, the latter is clearly associated with a tropical environment. The variable occurrence within such tropical areas may provide further clues to our knowledge of its aetiology but much more information is required about its distribution, particularly in the rural areas of the tropics and subtropics.

Congestive Cardiomyopathy (COCM)-COCM, sometimes referred to as idiopathic cardiomegaly, occurs throughout the world but appears to have an unusually high incidence in some tropical countries. The condition may be defined as congestive cardiac failure associated with bilateral ventricular dilatation and hypertrophy in the absence of specific pathology such as myocarditis, amyloidosis, ischaemic or valvular heart disease. Some cases of heart failure are associated with clear cut aetiological factors such as chronic alcoholism, vitamin B₁₂ deficiency or cobalt poisoning. The association of COCM with hypertension and the relationship between the two has been the subject of much debate, but it is evident that as COCM is not the usual end-result of severe hypertension some other myocardial factors may be involved.

Epidemiologically, the evidence suggests that COCM is more common in black than in white populations, and in some clinical and necropsy series from Africa and the West Indies this condition accounts for quite a large percentage of all cardiac cases or deaths. However, precise information about the prevalence of the condition is lacking and in proportional terms, COCM will always appear to be more common in populations in which IHD is rare.

Cardiac disease associated with tropical parasitic infections - While it is possible that some parasitic infections may be indirectly associated with the aetiology of diseases such as EMP, there are a few conditions where the association is causative. On a numerical scale, although it is confined to the South American Continent, Chagas' disease due to infection with *Trypanosoma cruzi* is the most important form of parasitic heart disease, accounting for a large percentage of patients with heart disease in many areas of some of the countries of South America, particularly Brazil and Venezuela. The distribution, clinical and pathological features are discussed in detail elsewhere in this journal.

Myocarditis, may complicate *T. rhodesiense* and *T. gambiense* infections in Africa but the

cardiac involvement is rarely important clinically or in terms of heart disease in the population. Likewise Cor Pulmonale associated with heavy *S. mansoni* infection in the lungs, nematode larval involvement of the heart and leishmanial cardiac lesions are rare clinical problems.

CONCLUSIONS

Studies of cardiovascular diseases in the tropics are still limited to certain localised areas of particular countries and regions, nevertheless, much valuable information has been acquired over the last 40 years and this forms the basis for more detailed studies in the future. The role of the epidemiologist in the study of heart disease is an essential one, but should be closely linked with the study of particular diseases by clinicians and pathologists if we are to maximize our understanding of these important problems.

RESUMO

Somente em décadas mais recentes tem sido possível reunir informações que permitem ajuizar a importância das doenças cardiovasculares. É destacada a limitação de informações derivadas das áreas tropicais, praticamente

exclusivas de regiões restritas de alguns países. A doença reumática é considerada a causa mais comum de cardiopatia em pessoas de até 40 anos e é atribuída à elevada incidência nas regiões tropicais e subtropicais. É aparente o aumento de incidência da doença isquêmica do coração, particularmente nas sociedades que sofrem rápidas mudanças de estrutura. Apesar da distribuição universal da endomiocardiofibrose, ela é endêmica em regiões tropicais. Nessas regiões, é também elevada a incidência de insuficiência cardíaca de etiologia obscura (cardiomiopatia congestiva). O autor discute a associação de infecções parasíticas e cardiopatia.

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