Tropical pathology

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Tropical Pathology

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Mr. President, Ladies and Gentlemen,

May I first thank you and the members of your Academy for the honour you have done me in inviting me to speak here today. It was with very great pleasure I accepted although with some trepidation as the subject of "Tropical Pathology" is all embracing. I should first like to emphasise that the diseases of temperate climates also occur in the tropics, although they may be modified both in frequency and clinical presentation by environmental factors including local sanitary conditions, parasitic infection, dietary deficiencies, by the altered immunological status of the host and by inherited haemoglobin or enzymatic abnormalities. The frequency of jaundice in lobar pneumonia, now known in Zaria to be associated with the deficiency of the enzyme glucose-6-phosphate dehydrogenase (Tugwell, 1973), the excessive severity of measles, the lowered frequency of autoimmune disease, the lesser intensity of atherosclerosis, the virtual absence of coronary artery disease in some areas, although essential hypertension is not uncommon, and a different cancer pattern are a few examples. I think it is workers in the tropics who have demonstrated the importance of the study of geographical pathology, and in this connection the varying incidences of the Burkitt tumour and liver and oesophageal cancer in different parts of the world are just three of the many examples that could be quoted.

The knowledge and impressions of a pathologist working in the tropics are greatly influenced by the pattern of endemic disease in the surrounding population. For instance I have no practical knowledge of such important conditions as Chagas disease, clonorchiasis, *S. japonicum* infections, the leishmaniases or the rickettsial diseases and little experience, apart from biopsy material, of trypanosomiasis, onchocerciasis and leprosy. The last two however must be mentioned as they, in addition to trachoma and xerophthalmia, are major causal factors in the blindness which is such an enormous problem in Africa and India. Wilson (1972) stated that there were millions of blind in the developing countries whose sight even now could be restored by surgery. Ventigataswamy (1972) estimated that the number was 10 million in India alone.

To return to West Africa – to someone who pas practised pathology there for almost three decades – the advances in our knowledge in the last few years have been astounding. Conditions which were considered rarities or even undescribed a few years ago are now known to be common and can be learnedly discussed by medical students. Examples are the Burkitt tumour, endomyocardial fibrosis, idiopathic cardiomegaly, idiopathic arteritis of unknown origin, subcutaneous phycomycosis, rhinophycomycosis, African histoplasmosis, mycobacterial ulcers, the tropical splenomegaly syndrome, quartan malarial nephrosis and in a far wider context the abnormal haemoglobin diseases – and this list is anything but comprehensive. Village surveys in the forest belt of West Africa have revealed the disease pattern of the rural population (COLBOURNE et al., 1950; MCGREGOR and SMITH, 1952; GILLES, 1967) and all have given very similar results and increased our understanding of the polypathology seen at autopsy. The pattern of malaria was found to be stable, hookworm infection was present in about 50% and ascariasis in 70% of the population. Yaws was a problem of magnitude but is now a rarity due to the most successful campaigns by the World Health Organisation. Clinical and post mortem studies have clarified our ideas on the causes of mortality and morbidity and have uncovered conditions which were thought to be rare or had not been previously described in West Africa. Time does not permit the discussion of detailed pathology, so I propose to rapidly survey the problems as I have seen them at autopsy. Hookworm infection causes anaemia, hypoalbuminaemia and possibly malabsorption. It in itself would rarely appear to cause death but it is impossible to estimate its indirect effect on morbidity and mortality. The same can be said of ascariasis – the importance of Loeffler's syndrome is unknown. Occasionally intestinal obstruction due to a mass of tangled worms or asphyxia by aspiration into the trachea may cause death. We rarely have seen a granulomatous peritonitis due to the presence of ova in the peritoneal cavity and cholangitis and liver abscess are said to be complications in the Far East.

Excluding amoebiasis, dracontiasis and schistosomiasis the most important protozoal and helminthic diseases have been mentioned. Amoebiasis accounts for death in 1.9% of our autopsies, and the most common complications are liver abscess and peritonitis. It is interesting that there was a significantly increased frequency in pregnant when compared with non-pregnant females (ABIOYE and EDINGTON, 1972). In addition to amoebiasis a number of diseases would appear to be more severe in pregnancy including malaria, pneumoccocal meningitis (LUCAS, 1964), infectious hepatitis and smallpox, and a fulminating form of the Burkitt tumour has been described. Pregnancy in the tropics is hazardous as conception usually occurs at an early age in the presence of multiple infections and infestations. Iron deficiency, malarial and folic acid deficiency anaemias are common and there may be abnormal haemoglobin diseases present. Medical care with adequate antenatal supervision is lacking in many areas and consequently delay in labour with rupture of the uterus and other complications are common.

Dracontiasis is rife in certain areas and causes considerable disability and misery but is not an autopsy problem.

Digest studies of the bladder have revealed a 20% frequency of urinary schistosomiasis in our autopsy material in Ibadan (EDINGTON et al., 1970). The frequency and intensity of infection in 673 post mortem in males and females are shown in Figures I and II. It is interesting that the frequency rises with age in males but the intensity of infection falls over the age of 40 years. It is fortunate that the intensity of infection in the majority of instances is mild and death seldom results although a different picture was found some years ago in Ghana (EDINGTON, 1958). In 19,862 surgical biopsies in Ibadan schistosomiasis was only noted in 102 specimens and in many instances was an incidental finding (EDINGTON, 1967). Although therefore *S. haematobium* infection is a relatively bland condition in Ibadan, its importance in pathology will vary according to the intensity of infection and an entirely different situation may be found in other parts of Nigeria and is found in Egypt and Mozambique. *S. mansoni* infections are not a great problem in Southern Nigeria but may be in the North. Death may occur from Symmers clay pipe stem fibrosis and the pathological findings have been reviewed by CHEEVER and ANDRADE (1967).

I cannot leave the parasitic diseases without mentioning malaria. The presence of stable malaria is one of the greatest if not the greatest problem in West Africa and is also found in East Africa and New Guinea. The new born child is immune, but the mortality in the 6 months to five years old age group has been variously estimated as from 5 to 15 percent. Death is usually due to cerebral malaria or malarial anaemia. Evidence of chronic malaria is invariably present in the organs of children at post mortem and it is impossible to estimate its effect on morbidity and indirectly on mortality in this age group in which gastroenteritis, bronchopneumonia, measles, tuberculosis and protein calorie deficiency diseases are common causes of death. Immunity is gradually gained and the oldest child I have seen dying directly from the effects of malaria in the forest belt of West Africa was seven years. With urbanisation the pattern will change.

The indirect effects of malaria on populations has aroused much interest in recent years having been implicated in such diverse condition as malarial nephrosis, the idiopathic tropical splenomegaly syndrome, auto-immune disease, the abnormal haemoglobin diseases, blood group systems and malignancy.

Malarial nephrosis is common and is associated with *P. malariae* infection. It affects most frequently children in the 5–7 year old age group. The proteinuria is usually poorly selective. The renal lesions are peculiar (EDINGTON, 1967) and have been designated quartan malarial nephropathy (HENDRICKSE et al., 1972). Segmental basement membrane thickening with progressive obliteration of capillaries and measangial sclerosis occurs. In a few cases segmental hypercellularity may be seen. In early cases many of the glomeruli are normal. The lesion is progressive and eventually leads to the end stage

kidney. Electron microscopy shows some fusion of the foot processes of the epithelial cells, deposits of subendothelial basement membrane-like material and thickening of the membrane itself which may contain aggregations of electron dense material. The presence of small lacunae scattered throughout the basement membrane is thought to be diagnostic.

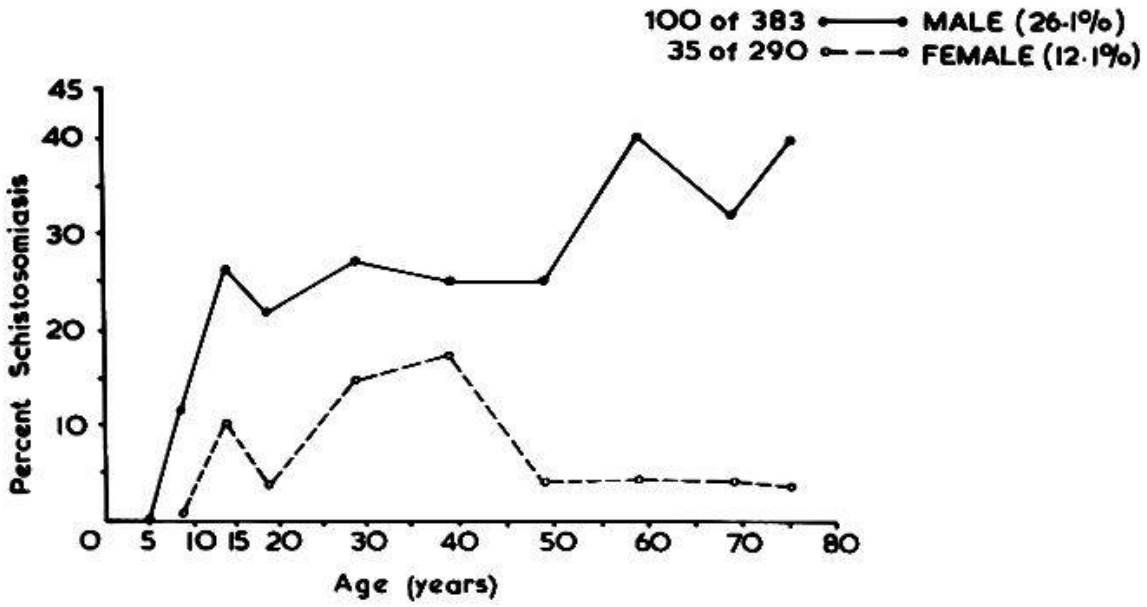
Immunofluorescence microscopy shows granular, diffuse and mixed patterns of fluorescence. IgG, IgM and complement (C3) are present. *P. malariae* antigen was detected in one third of the patients we studied. *P. falciparum* antigen and streptolysin 0 were absent. It is considered that quartan malarial nephrosis is an immune complex disease which when once established pursues a progressive course. – It is of interest that one third of patients dying of chronic renal disease in Ibadan are under the age of twenty years.

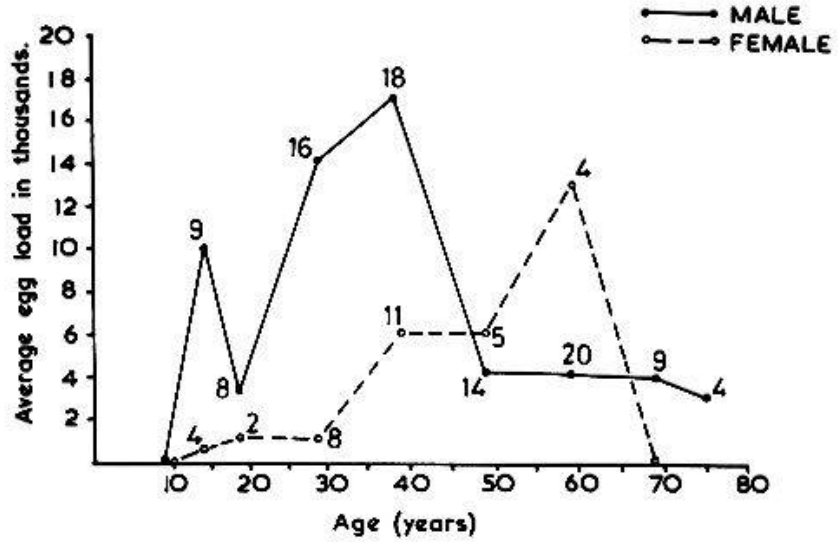
I should like to say a few words about the abnormal haemoglobin diseases. We now know that the high incidence of the S. gene lethal in its homozygous expression, is due to the protection the heterozygote enjoys against the lethal effects of *P. falciparum* malaria. In Accra and Ibadan the combined frequencies of the haemoglobin S and C traits are in the region of 30% and it is strange to think that when I first went to West Africa I was led to believe that sickle-cell anaemia was rare. I soon found that this was not so and we now know that 3% of children born in West Africa suffer from either sickle-cell anaemia or sickle-cell haemoglobin C disease with a small number suffering from pure haemoglobin C disease. These diseases accounted for about 3–4% of post mortem deaths but the pattern is changing as the "sequestration crisis" is being successfully treated. This type of crisis is most usually seen in SC disease especially in the last trimester of pregnancy. At post mortem the spleen is almost pathognomonic – being enlarged, rubbery and slaty blue in colour. The pulp is packed with sickled erythrocytes. There is also massive erythrophagocytosis by the Kupffer cells of the liver.

The "infarctive crisis" still occurs frequently – especially when it affects the bone marrow with pulmonary marrow embolism, it causes a fatal outcome (Edington and Gilles, 1969). The high frequency of these abnormal haemoglobin diseases is proving an enormous problem in haematological clinics and indeed in many other branches of medicine as anaesthesia and surgery may be hazardous. The value of marriage counselling is being at the moment widely discussed.

With regard to the viral diseases rabies is rife, yellow fever is occasionally seen and smallpox still occurs. Measles and trachoma have been mentioned. At present with the sanitary conditions pertaining poliomyelitis is not a frequent cause of death (before preventive inoculation it was the commonest cause of death in expatriates). With improved sanitation however it is going to become a greater problem and indeed the children of the professional classes are already beginning to suffer if uninoculated. The same might also be said of diphtheria.

A "new" virus disease, Lassa fever, was reported from Nigeria in 1969 (Frame et al., 1970) and it has now been reported from Sierra Leone and





Liberia (Editorial, 1972). The pathology resembles somewhat that described in Omsk, Argentinian, Bolivian and Thai haemorrhagic fevers. The prognosis is variable but is usually grave in immigrants. It is highly contageous and post mortem examination is a hazard. An accident during a post mortem examination led to the death of Dr. J. M. Troup who was one of the codiscoverers of the condition and was investigating its pathology at the time of her death.

The bacterial diseases tuberculosis, tetanus, typhoid, pneumococcal and meningococcal meningitis are extremely common causes of death and recently cholera has been added to the list. In India there are said to be over five million cases of tuberculosis with 0.5 million patients dying per year. The frequency in one of our post mortem series was 7% and florid and unusual pathological manifestations are common. The treponematoses are not a problem in Ibadan and syphilitic cardiovascular disease is uncommon although common in some parts of the tropics. Rheumatic heart disease and

endomyocardial fibrosis are not infrequently diagnosed and occasionally peculiar annular subvalvular left ventricular aneurysms in young adults are seen (ABRAHAMS et al., 1962, EDINGTON and WILLIAMS, 1968).

I regret that I do not have time to consider the pathology of protein calorie malnutrition of early childhood which is so commonly seen at post mortem and frequently associated with measles or tuberculosis. Endemic goitre and the interesting pancreatic calcification of unknown aetiology which occurs in young diabetics are also worthy of mention. Lastly, I should also have likes to discuss the recent exciting developments in our knowledge of the Australia antigen, alpha feto-protein, liver disease and primary liver cell carcinoma and the linkage of the E. B. virus, stable malaria and the Burkitt tumour – to say nothing of the experimental work on the herpes viruses and lymphomas in laboratory animals. The possible teratogenic effects of anti-alpha-feto protein antibody are also worthy of mention (SMITH, 1972).

I have tried, Ladies and Gentlemen, in this short period to give you a "bird's eye view" of tropical pathology – I have of necessity had to omit much that is new and exciting in our recent progress in research – but I hope I have demonstrated the tremendous challenge that tropical pathology offers in the field of preventive medicine – which should be the primary aim of all of us working in medicine in the tropics.

Summary

It must not be forgotten that diseases of temperate climates also occur in the tropics although their frequency and clinical presentation may be modified by environmental factors, a differing cancer pattern being only one example.

The major diseases and their complications as seen by a pathologist in the forest belt of West Africa have been briefly described. The importance of tuberculosis, protein calorie malnutrition of early childhood and measles as causal factors in mortality has been stressed. Particular attention has been paid to the pathological manifestations of malaria, schistosomiasis and the abnormal haemoglobin diseases.

Zusammenfassung

Es darf nicht vergessen werden, dass die Krankheiten der gemässigten klimatischen Zonen auch in den Tropen vorkommen, auch wenn ihre Häufigkeit und ihr klinisches Erscheinungsbild durch Faktoren der Umgebung verändert werden können. Das unterschiedliche Auftreten der Krebsformen sei dafür als Beispiel aufgeführt.

Es werden die wichtigsten Krankheiten und ihre Komplikationen, wie sie von einem Pathologen in einer Waldgegend von West-Afrika gesehen werden, kurz beschrieben. Es wird betont, wie wichtig die Tuberkulose, die Mangel- und Fehlernährung während der frühen Kindheit, sowie die Masern als kau-

sale Faktoren für die Sterblichkeit sind. Besonderes Gewicht wird auf das pathologisch-anatomische Bild der Malaria, der Schistosomiasis sowie der Krankheiten mit abnormem Hämoglobin gelegt.

Résumé

Il ne faudrait pas oublier que les maladies des zones tempérées se rencontrent aussi dans les tropiques, même si leur fréquence et leur évolution clinique sont modifiées par les facteurs environnants. Les différences dans l'apparition du cancer peuvent en être un exemple.

L'auteur décrit les maladies principales et leurs complications, telles qu'un pathologiste a pu les voir dans une région boisée de l'ouest africain. La tuberculose, une alimentation fausse ou insuffisante durant la petite enfance, mais aussi la rougeole jouent un rôle prépondérant dans la mortalité. L'auteur souligne tout particulièrement l'anatomo-pathologie de la malaria, de la schistosomiase et des affections dues à une hémoglobine anormale.

Riassunto

Non bisogna dimenticare che le malattie delle zone climatiche temperate possono svilupparsi anche in quelle tropicali, seppure la loro frequenza e le loro manifestazioni cliniche possano venire influenzate da fattori ambientali. Si pensi ad esempio ai diversi modi di apparizione del cancro.

Vengono descritte in breve le principali malattie e le loro complicazioni quali le ha viste un patologo in una regione boschiva dell'Africa occidentale. Si sottolinea l'importanza della tuberculosi, delle carenze e degli errori di nutrizione durante la prima infanzia e del morbillo quali fattori causali nella mortalità. Speciale attenzione è rivolta all'aspetto anatomo-patologico della malaria, della scistosomiasi e delle emoglobinopatie.

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