INFECTIONS OF IMMIGRANTS

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DISEASES carried by immigrants to this country from the Tropics include infections-viral, bacterial, protozoal and helminthic.

Of these infections, some are transmissible and constitute a public health menace, some have only a very low degree of infectivity and give rise to little anxiety and some are innocuous under conditions which obtain in the United Kingdom. Smallpox is an example of the first group, leprosy of the second and ancylostomiasis of the third. While many such infections are ubiquitous in the Tropics, others have a strictly regional endemicity, some knowledge of which is essential to practitioners in this country. This point has been emphasised by Macgraith (1963) in a striking article entitled "Unde Venis?" (Whence have you come?).

Tuberculosis

Foremost among immigrant infections is tuberculosis which is understandable since it has now attained the status of the leading tropical disease. The disease may present itself in unusual guises, especially among children, in whom fever and wasting may be associated with polyadenitis and enlargement of the liver and the spleen, though the chest X-ray reveals no obvious infiltration and the hilar glands do not appear significantly enlarged. Such a condition seems to result from a bacterial invasion of the systemic circulation of low intensity. Acute caseous bronchopneumonia may develop in adults and Negro immigrants are especially prone to such ill-resisted types of the disease. Tuberculous salpingitis and endometritis are not uncommon in immigrants from any tropical country, while tuberculous ileitis will be encountered more frequently than Crohn's disease.

Leprosy

Leprosy, though widespread in the tropical belt, still occurs quite commonly in the Mediterranean basin; Cyprus and Malta being the source from which a number of infected immigrants have reached this country. The disease

has a low degree of infectivity especially in adult life, when only about 5% of the population retain any degree of susceptibility. The last known example of transmission of Hansen's disease in the British Isles occurred some 100 years ago in Ireland, when a soldier invalided from the Far East returned to his family cottage where he shared a bed with his young brother, who later fell a victim to the disease (Jopling, 1965). This anecdote illustrates two important epidemiological aspects of leprosy, namely the relatively high susceptibility of children and the necessity for prolonged intimate contact with an infective patient for transmission to take place. Exceptions do occur, however, and one meets occasional European patients who have acquired the disease in adult life in the East through casual and usually unknown contact. I recall the case of a Roman Catholic missionary priest from India, a British soldier, who served in that country during World War II and an English water-works engineer from Northern Nigeria. The incubation period may be long, for infection acquired in childhood may remain latent or inactive until adult life, when unusual stress or intercurrent infection may allow it to manifest itself. The disease displays many different facets, reflecting the varying degree of inherent resistance of the persons affected. Well-resisted disease presents as one or more large, asymmetrical areas, having a pink, raised, well-defined granulomatous margin, within which is a flattened, atrophic area of skin which is devoid of hair, hypopigmented, unable to sweat and showing impaired appreciation of all forms of sensation. This is the typical tuberculoid lesion, but an unusual variant is the flat, atrophic hypopigmented macule. Both these lesions may be accompanied by thickening of the regional sensory nerves, while damage to the motor fibres of affected mixed nerves often leads to weakness and muscle wasting. Occasionally a single peripheral nerve such as the ulnar or the facial may be damaged, though no skin lesion can be found. Nerve biopsy is then

essential to establish the diagnosis. Next to these lesions, which represent efficient resistance in the skin, are the dimorphous lesions, in which the balance of invasiveness of the organism and resistance of the host is precarious. This is an unstable phase, and in the absence of treatment, generalised invasion of the skin, mucous membranes and reticulo-endothelial system—the lepromatous form of the disease—may supervene. Dimorphous leprosy is characterised by large, asymmetrical macules usually visible as rings having clearcut inner margins enclosing an atrophic, hypoaesthetic zone, while the induration and hyperaemia gradually fade at the periphery to merge into normal skin. A symmetrical polyneuritis with palpable thickening of nerves is commonly associated with this type of lesion. In contrast with the tuberculoid types of lesion, in which lepra bacilli are exceedingly scanty, the casual organisms can be found in moderate numbers in both the dermis and the damaged nerves.

Lepromatous leprosy develops when an adequate cytological defence fails to mobilise at the point of entry in the skin. In the absence of an encompassing granulomatous reaction, histiocytes are invaded and provide both an efficient nidus for the corynebacteria and also a transport system which disseminates them through the entire reticulo-endothelial system. The characteristic facies is striking for the skin of the face is much thickened and nodules may develop at any site, especially on the pinnae; the normal furrows are accentuated and eyebrows and eyelashes are shed. The nose is obstructed and ulceration of the septum may cause it to collapse. The larynx may be affected, causing hoarseness or loss of voice and laryngeal stenosis may develop. The skin of the trunk may be generally infiltrated, but it is more common for ill-defined, slightly indurated plaques with a greasy surface to appear; these show no loss of sensation and sweating is retained. These plaques look slightly pale on a coloured skin, and slightly erythematous on the European skin. The extremities very often show puffiness or oedema and the skin is cold, hyperaemic and cyanosed, suggesting a disturbance of neuro-vascular control. A thickened, hairless, highly polished appearance of the skin over the shins may be quite striking. A degree of symmetrical polyneuritis with thickening of the affected nerves is usually found but is most marked in those who have passed through a prolonged dimorphous phase. Many variants of this classical picture may occur, and sometimes the disease is revealed only by the deve-

lopment of a few widely scattered pinkish papules, by a slight coarsening of the features with thinning of the eyebrows, or by occurrence on the trunk of subtle ill-defined macules described above. Nevertheless in such patients Hansen's bacilli may be found in skin scrapings taken from any part of the body and from the nasal septum. Lepromatous leprosy may involve the eye, in which miliary lepromata may develop in the cornea, the iris, in which they look like minute seed pearls, and on the retina. Invasion of the testis may lead to atrophy, to which gynaecomastia may be a sequel. A progressive osteitis of the phalangeal bones, together with repeated painless trauma, often leads to a gradual absorption of these bones, with shortening and distortion of the digits. Trophic ulcers provide a grave problem and often lead to osteomyelitis and to the total disorganisation of joints, especially in the foot.

Leprosy in this country may present a difficult diagnostic challenge and patients not rarely remain for long periods under incorrect treatment. Although therapy is comparatively straightforward in the case of the well-resisted tuberculoid and maculo-neural types of the disease, and can be conducted on an out-patient basis, the management of the disease in its dimorphous and lepromatous forms requires much experience, and protracted hospital treatment is always necessary. Two special institutions exist in England for this purpose, the Jordan Hospital, which is a branch of the Hospital for Tropical Diseases, London and the Home of St. Giles in Essex. The advice of a consultant in leprosy may be obtained in any area by application to the local Medical Officer of Health.

Venereal Diseases

Venereal diseases probably rank next in importance among immigrant infections. Syphilis and gonorrhoea need no special mention except to note that among coloured races the commonest manifestations of neurosyphilis are meningovascular in type, usually developing as a transverse myelitis of the thoracolumbar segments, or as a basal meningitis involving cranial nerves, especially the sixth and seventh. Lymphogranuloma inguinale, due to a large virus of the psittacosis group, is common among immigrants from the Caribbean area. The usual form of presentation is as a suppurating inguinal lymphadenitis, involving also the deep iliac group of glands, with marked peri-adenitis. There is considerable constitutional disturbance

and much pain and local tenderness. Sinuses form and discharge a glairy, grey, mucoid pus. Yet the disease may present a variety of other facets, which may lead to errors in diagnosis. An initial implantation of the virus within the urethral meatus may cause an acute urethrititis, from which the virus may be transported to the pelvic glands, whence it may invade the rectum causing a chronic granulomatous proctitis. Direct infection of the rectum by homosexual practice may occur. In the female, spread of the lesion from the vulva gives rise to the destructive genito-ano-rectal syndrome. The colonic lesion in either sex may extend from the anal canal to the splenic flexure, and there may be "skip" lesions. A granulomatous and stenosing submucous inflammation undermines the mucous membrane which is ultimately shed. In either sex extensive invasion of the inguinal lymphatic glands may be followed by a sclerosis which obstructs permanently the lymphatic drainage of the lower limb and genitalia—this may lead to gross elephantiasis of the vulva, a condition called esthiomene. The diagnosis is confirmed by the Frei skin test or by using a chick yolk-sac culture of the virus in a complement fixation reaction. Sulphonamides, tetracycline and chlortetracycline are curative, but stenosis of the bowel may require surgical measures.

A further venereal disease not uncommon among immigrants from the Caribbean islands is granuloma venereum or ulcerating granuloma of the pudenda; this is caused by a small intracellular organism called *Klebsiella granulomatis* and referred to as the Donovan body when it is seen within histiocytes in stained biopsy sections. The characteristic lesion is a very chronic shallow ulcer which slowly spreads from the genitalia onto the adjacent skin, and may be implanted onto contiguous surfaces of the thighs or transported on the fingers to distant areas. The disease is free from constitutional symptoms and causes little local discomfort; its only danger lies in its simulation of epithelioma, especially in the female, which may lead to unnecessary irradiation or excision. The causal organisms are readily demonstrated by biopsy and the treatment with streptomycin is rapidly successful.

Intestinal Infections and Infestations

Intestinal infections among immigrants are of importance when such persons seek employment as food handlers. Asymptomatic passers of cysts of *Entamoeba histolytica* are not commonly found among coloured workers, and

symptomatic amoebiasis is rare. In asymptomatic or mild amoebiasis the infection can usually be eradicated by a 10 day's course of entamide furoate (Furamide, Boot's), 500 mg. being given three times daily by mouth. This drug has no toxic side effects.

Carriers of *Shigella* or *Salmonella* organisms are equally unusual, but if found, require treatment with an antibiotic appropriate to their sensitivity.

Infection with the protozoon, *Giardia lamblia*, is extremely common throughout the tropics, and since this parasite is a potent source of duodenal and jejunal irritation and is even capable of causing a gross malabsorption syndrome, its eradication is essential. This is easily achieved by the use of mepacrine 100 mg. t.d.s. for seven days, though treatment may occasionally have to be repeated after one month's interval, to obtain complete eradication.

Helminthic infections abound among immigrants from the Tropics and commonly comprise ascariasis, trichuriasis, ancylostomiasis and strongyloidiasis. Only the first two can be transmitted by direct faecal contamination of food; the third and fourth parasites undergo stages of development in the soil and infect fresh hosts by the direct penetration of their larvae through the skin of the feet. Ascariasis can conveniently be treated with piperazine compounds, the usual preparation being piperazine adipate (Antepar, Burroughs Wellcome and Co.), 1800 mg. as a single dose given after an overnight fast, without subsequent purgation. An alternative preparation is Pripsen. (Westminster Laboratories) in a single dose of 10 grams taken whilst fasting. Trichuriasis causes no symptoms unless a massive infection exists when colonic irritation may be caused. Dithiazanine iodide (Telmid, Wyeth) which was formerly widely used against this parasite has recently been withdrawn from the general market following reports in rare instances of its toxicity. Pyrvinium pamoate (Vanquish, Parke Davis and Co.) should be used instead, the dose for an adult being 100 mg. three times daily for 5 days.

Though ancylostomiasis was once rife in the Cornish tin mines, one can scarcely visualise conditions in England to-day suitable for such transmission. Ancylostomiasis, though it rarely causes anaemia in the well-nourished European, is a potent cause of iron depletion in immigrants from the Tropics, especially in women on whose iron stores a further drain falls in preg-

nancy. Since a single worm may abstract from 0.05 to 0.2 ml. of blood daily, a modest load of 100 worms would cause a loss of between 5 and 20 ml.: haemoglobin being a poor source of iron available for re-absorption, iron deficiency is readily induced. Of the two human hookworms, *Ancylostoma duodenale* is the larger and more avid, *Necator americanus* smaller but more deeply buried in the crypts of the duodenal mucosa, where it is less accessible to vermifuges. The least toxic drug available and the most convenient for general use is bephenium hydroxynaphthoate (Alcopar, Burroughs Wellcome and Co.) which is dispensed in granular form. A single dose of 5 g. may be given after an overnight fast even to an anaemic, emaciated child, but for complete eradication of the infection in an adult, this dose should be repeated daily for four days. No purgation is required.

Strongyloidiasis, like ancylostomiasis, may cause duodeno-jejunal irritation when the infection is very heavy and may occasionally cause a frank malabsorption state, but its most important manifestation is the peculiar rash produced by the wandering larva which arises from auto-reinfection. The ova hatch in the intestine and within the colon itself the non-infective rhabditiform larvae may change into the penetrative filiform larvae which re-enter the tissues. Their passage beneath the skin causes a linear urticarial wheal, like a whip-lash, which is very irritant. Such lesions are often encountered among former Far East prisoners-of-war, in whose bodies the parasites have managed to perpetuate themselves for over 20 years. Telmid having fallen into disrepute, Vanquin should be used as for trichuriasis, but a very promising new drug, thiabendazole, widely used as an anthelmintic in sheep, is at present under clinical trial in man.

Schistosomiasis

Schistosomiasis is often encountered in immigrants from West and East Africa. In persons from these areas any urinary symptoms should arouse a suspicion of infection with *S. haematobium*. Frequency of micturition with terminal haematuria characterise the early stages, when later the bladder becomes contracted frequency becomes more marked and hydronephrosis and hydroureter, due to fibrosis at the urtero-vesical junction, tend to develop. Secondary infection then supervenes with disastrous results and malignant changes may develop in the bladder wall. The diagnosis is established by the presence of the characteristic ova with

a lateral spine in the urine or in biopsy material removed from the bladder, while the schistosoma complement fixation reaction will be positive. (This very useful test is carried out only in laboratories which specialise in tropical disease, such as the Hospital for Tropical Diseases, London). Infection with *Schistosoma mansoni* occurs throughout Africa, in Brazil and in some of the Lesser Antilles. The symptoms are more subtle than those produced by *S. haematobium*, as the brunt of the damage falls on the colon and liver. In Europeans the onset may be marked by systemic disturbance, diarrhoea with blood and mucus, and tender enlargement of the liver and spleen. The disease may be the cause of chronic ill health, failure of growth and hepatosplenomegaly in children. In those whose infection dates from childhood a frank cirrhosis of portal type may be found in adult life, while on sigmoidoscopy multiple papillomata may be demonstrated; in those, malignant metaplasia may ultimately ensue. The treatment of schistosomiasis is protracted and requires the use of trivalent antimony compounds by injection. Since these are all potent myocardial toxins, experience and care are called for in their use. It is wise to refer patients suffering from schistosomiasis to a hospital which specialises in the treatment of tropical disease.

Filariasis

The filarial diseases complete the list of infections likely to be encountered in immigrants. Infection with *Wuchereria bancrofti* is encountered throughout the tropical belt, with its highest endemicity in British Guiana—60% of the inhabitants of Georgetown, the capital, carry this parasite. Multiple infections from childhood are necessary in order to produce the lymphatic obstruction which is the basis of the symptomatology, at least five years are required for the disease to manifest itself and European intruders into endemic areas very rarely received sufficient infective bites to acquire the disease. Fever with recurrent inguinal lymphadenopathy, lymphoedema of the leg or genitalia and chyluria are the usual manifestations. Recurrent epididymitis, funiculitis and hydrocele should also make one suspicious of this disease, which may be confirmed by the demonstration of sheathed microfilaria in the peripheral blood taken between midnight and 2 a.m. The leucocyte count will show a high eosinophilia and the filaria complement fixation test will be positive. Treatment is by the use of diethyl-carbamazine (Hetrazan or Banocide, 50 mg.),

in a dosage of 3 mg. per kg. body weight three times daily for 21 days.

West Africans particularly are liable to complain of symptoms of two filarial diseases which are prominent in tropical Africa. These are loiasis and onchocerciasis. The not infrequent statement that the patient has got a worm moving under his skin may literally be true, for the adult *Loa loa* moves freely in the subcutaneous tissues and fascial planes. While crossing the bridge of the nose, the malar region, the globe of the eye or the tarsal plate beneath the conjunctiva, it may be visible and can be removed under local anaesthetic. Elsewhere, probably through damage by pressure resulting in the release of allergens, the presence of the worms is revealed by the development of patches of giant urticaria, which subside usually after a few hours, but may persist for three days. These are called Calabar swellings and the usual sites of their appearance are the forearms, dorsum of the hands and the region of the ankles. Exertion frequently precipitates their onset. The diagnosis is easily confirmed by examination of a thick film of blood stained with Leishman's or Geimsa's stain, in which the characteristic sheathed microfilaria will be found: these have a diurnal periodicity. Treatment is with Banocide as for infection with *W. Bancrofti*, though a 10 days' course will suffice. Onchocerciasis, due to the worm, *Onchocerca volvulus*, is characterised by irritant skin lesions, sometimes associated with conjunctival irritation and the development of patchy, "nummular" keratitis. Painless subcutaneous nodes, commonly situated below the iliac crests or the upper thigh, reveal the presence of the adult worms which may remain in one site for several years in an intricately coiled mass surrounded by fibrous tissue. Microfilaria, which have no sheath, may be found in superficial skin biopsy sections—skin snips—which should be teased in normal saline on a microscope slide. When left at room temperature under a coverslip for 30 minutes, the larvae can be seen wriggling out from the edges of the specimen. Microfilariae may be obtained in a similar manner from conjunctival snips and may be seen on occasion swimming

in the aqueous humour when the eye is examined with the corneal microscope. Treatment with Banocide is usually accompanied by a brisk allergic reaction and should be carried out in a special tropical diseases centre. Europeans returning from tropical Africa often harbour one or both of these filarial worms.

The last filarial disease worthy of mention is dracontiasis, due to the invasion of the subcutaneous tissues by the female worm, *Dracunculus medinensis*. Since the infection is acquired by drinking water containing numbers of water-fleas (Cyclops) containing the larvae of the worm, the disease in this country is likely only to be found among immigrants of the labouring classes from the Tropics, excluding the New World. After fertilisation of the female in the tissue spaces the male worm dies but the female may grow to 16 inches in length and when gravid may reach the dimensions of a large earthworm. Wandering through the tissue planes towards the ankles the worm causes no reaction until the feet are immersed in water, when she secretes a proteolytic enzyme which raises a blister into which she protrudes. When the blister burst larvae are discharged in vast numbers as a milky fluid. The female worm can then be grasped and slowly withdrawn by winding on a match stick, the whole operation taking several days. If the worm can be palpated it may be removed whole through an incision made across it, by gentle traction with an aneurism needle. Death of the worm is usually followed by infection of its track, leading to cellulitis. If untreated, this may cause extensive peri-articular fibrosis with severe dysfunction of the ankle joint.

Immigrants from the Tropics often have a limited knowledge of English and describe a wealth of improbable symptoms in quaint phraseology. Some of these, however, may well have an organic basis in an infection peculiar to the Tropics, and it is to aid the puzzled physician that this article has been written.

REFERENCES

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