

lung is a form of respiratory allergy resulting from the inhalation of aerosols from mouldy hay. Symptoms are attributable to defects in ventilatory diffusion and appear in sensitized subjects four to six hours after exposure.

The major antigens are spores of *Micropolyspora faeni*, a saprophytic and thermophilic actinomycete that grows in microbially decomposing hay that has reached temperatures of 40-60°C. Both acute and chronic forms of the disease occur, and if repeated contacts with the inciting allergens occur, the lungs may become severely damaged.

The precise immunopathogenic mechanisms responsible for the condition are not yet fully understood.

Affected individuals usually have serum precipitins to *M. faeni*, and these are thought to be implicated in the disease process by complexing with inhaled antigens and activating complement in a manner similar to that occurring in the type III (Arthus) reaction.

It is not yet known if other hypersensitivity mechanisms are involved, and as yet no satisfactory animal model has been developed. There are some indications that type IV reactions might be present but the validity and significance of the data remain to be established.

Farmer's lung is diagnosed clinically, but laboratory findings may be helpful. Work at the Mycological Reference Laboratory has shown that glycopeptide antigens extracted from *M. faeni* are capable of detecting antibodies in the sera of a high proportion of cases of farmer's lung.

Leptospirosis

L. H. TURNER (*Leptospirosis Reference Laboratory (PHLS), London*) Of the 18 agglutinogenic serogroups which are now included in the Interrogans complex (parasitic, pathogenic strains) of *Leptospira*, at least seven are represented in the United Kingdom. These are Icterohaemorrhagiae, Javanica, Canicola, Ballum, Autumnalis, Australis, and Hebdomadis (Sejroe).

Animals from which strains have been isolated in the UK are rats, house mice (wild, pets, laboratory stock), dogs, cattle, pigs, and various wild mammals—field mice, voles, shrews, hedgehogs.

The initial phase of leptospiral infections is a septicaemia. Many combinations of symptoms and signs can result. None of these is pathognomonic, and the

clinical impression is often of viral rather than bacterial infection. Leptospirosis can cause syndromes resembling aseptic meningitis, encephalitis, other fevers with involvement of the nervous system (non-paralytic poliomyelitis, transverse myelitis); 'influenza' (which may be complicated by jaundice or renal involvement); enteric fever, glandular fever, atypical pneumonia, pyrexia of unknown origin, and various combinations of hepatic, renal, meningeal and haemorrhagic manifestations all of which are still referred to as Weil's disease. In fact, Landouzy (France, 1883), Weil (Germany, 1886), and Vasilijev (Russia, 1888) independently described a *syndrome* which we now know can be caused by agents other than *Leptospira*.

Diagnosis is usually by serological tests. Of various 'genus-specific' screening tests, a CF test with antigen supplied by the Reference Laboratory is conveniently used—with a battery of viral antigens—in testing sera from febrile patients. Positive and suspicious sera should then be sent to the Reference Laboratory for the microscopic agglutination test, which will often indicate the agglutinogenic serogroup to which the infecting strain belongs. Such information will indicate the likely epidemiological factors in the case.

References

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Psittacosis

A. D. MACRAE (*Public Health Laboratory, Nottingham*) Small numbers of human infections by the psittacosis group of organisms are reported each year in the UK. In the minority of instances these have an epidemiological association with sick birds, mainly imported psittacines but also others such as pigeons and budgerigars. Most infections however come to light because of inclusion of a psittacosis group antigen in serological screening tests for lower respiratory illness or undiagnosed pyrexia.

Though psittacosis primarily affects birds, particularly parrots, spread to man from contact is obviously possible. The aetiological rôle of the organisms, or chlamydia as they are known, was first established by Bedson and his colleagues

some 45 years ago. Despite being obligate intracellular parasites they differ from viruses in their larger size, possession of both types of nucleic acid, a cell membrane, and the capacity to multiply by binary fission.

Many avian species may be affected though such birds, being mostly healthy carriers, do not normally excrete the organisms. When subjected to adverse conditions or stress or during breeding their resistance can be lowered so that excretion recurs. Young birds exposed to infection as fledglings either succumb to the disease or become carriers in turn.

Chlamydia have also been isolated from a variety of animals so that the possibility of human infection by transfer from domestic species such as sheep or cattle must be borne in mind.

Q Fever

R. J. C. HART (*Public Health Laboratory, Exeter*) Between 50 and 60 cases of Q fever are reported annually in England and Wales. The causative organism, *Rickettsia (Coxiella) burneti*, is widely distributed in sheep and cattle but does not cause disease in them. It is present in very high concentration in the products of conception and is excreted in faeces and milk.

Infection in man is often symptomless. The commonest illness is pyrexia, sometimes with respiratory symptoms, but severe pneumonia is rare. Complications include myocarditis and endocarditis, which usually involves the aortic or mitral valves and has a poor prognosis.

Diagnosis is by complement fixation test to demonstrate a rising titre of antibody in paired sera. Phase 2 antigen reacts with antibody produced in acute infections but antibody to phase 1 is found in patients with endocarditis. Infection of cattle is shown by inoculating milk intraperitoneally into guinea pigs and demonstrating a serum antibody response in them.

A minority of patients require treatment, and tetracycline is the antibiotic of choice. It must be given for many months to patients suffering from endocarditis.

Toxoplasmosis in Town and Country

W. KWANTES (*Public Health Laboratory, Swansea*) There exist three forms of the *Toxoplasma* parasite, the crescent-shaped trophozoite, the encysted forms

found in tissues, and a very resistant and infectious oocyst found in the stools of cats. Each can play a different rôle in the spread of infection. It is a unique protozoan parasite in that it is not host-specific and affects virtually all species of mammal and birds. The prevalence of toxoplasma antibody varies not only between town and country but also in different regions of the world. In town dwellers in Lincolnshire the incidence is about 22%, whereas it is about 36% in the rural areas. In urban Hong Kong, it is 6% whereas in urban Paris it is 90%. In rural Sudan it is 22% whereas in rural Tristan Da Cunha it is 80%.

There are still many unsolved problems on how man and animals become infected. Man is surrounded by animals which may transfer infection to him. In towns they will be mainly cats and dogs but in the country man is in contact with a much wider variety of animals. Another factor is raw meat which may contain the toxoplasma parasite but little is known to what extent this can cause infection. In France it has been shown that the ingestion of raw meat can cause infection, and the high incidence of toxoplasma antibodies in Parisiens could be due to their eating habits.

In Birmingham owners of either a cat or dog have been shown to be associated with a higher incidence of toxoplasma antibody, and these animals probably play a significant part in the transfer of infection.

Much more research is needed into the epidemiology of toxoplasmosis.

Mycoplasma, Doxycycline, and Human Infertility

M. BLADES, J. DE LOUVOIS, R. F. HARRISON, AND ROSALINDE HURLEY (*Queen Charlotte's Hospital for Women, London*) *Mycoplasma hominis* was isolated from the genital tracts of 13.2% of 38 fertile and 14.7% of 109 infertile couples and *T. mycoplasmas* from 52.6% of fertile and 57.2% of infertile couples.

Minimum inhibitory concentrations of doxycycline for *T. mycoplasmas* (0.16-0.32 µg/ml) and *M. hominis* (<0.08 µg/ml) were determined.

A double-blind controlled trial of doxycycline was carried out on 88 fertile couples. Levels in seminal fluid (0.22-0.95 µg/ml), cervical mucus (0.06-3.02 µg/ml), and serum (0.43-3.98 µg/ml) were measured. Twenty-eight days' treatment with doxycycline (100 mg/day) eradicated

mycoplasmas from the genital tract but there was no difference in the rates of conception of the treated or control groups.

We are unable to confirm the suggestion of Gnarpe and Friberg (1972) that doxycycline is of benefit in the treatment of primary infertility.

Reference

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 II. Concentrations of doxycycline in serum and seminal fluid and the effect on the growth of *T. mycoplasmas*. *Amer. J. Obstet. Gynaec.*, **114**, 963-966.

Micrococcal Urinary Infections in Young Women

MARGARET A. SELLIN, W. A. GILLESPIE, AND J. D. ANDERSON (*Department of Bacteriology, University of Bristol and Department of Pathology, County Hospital, York*) Prospective surveys of acute urinary infections in females aged 17 to 25 showed that most, perhaps the great majority, of the infections followed sexual intercourse. Nearly all were caused by either *Escherichia coli* or micrococci. The micrococcal infections were about half as common as the coliform ones. Micrococcal infection often produced more pyuria than coliform infection, and symptoms were at least as severe.

All the infecting micrococci belonged to Baird-Parker type 3 and all were novobiocin-resistant. Most were sensitive to sulphonamide. Sulphonamide treatment was usually satisfactory.

The *Micrococcaceae* present in the urethra and introitus of healthy young women were investigated in forestream urine specimens and peri-urethral swabs. Forestream urine from healthy young men was also investigated. Staphylococci (all of which were coagulase-negative) outnumbered micrococci in the urethra of both sexes. Most micrococci belonged to types 1, 2 or 3, but very few of the type 3 strains were novobiocin-resistant. Thus the novobiocin-resistant type 3 strains responsible for urinary infection were rarely found in the normal urethra. These findings point to an exceptional virulence of the micrococcal biotype responsible for urinary infection. So far there has been little evidence to suggest that the infecting micrococci were transmitted from males to females.

Aspects of Rubella Immunity in Wales

JULIA A. MUNRO (*Public Health Laboratory, University Hospital of Wales, Cardiff*) Although rubella is usually a mild illness of childhood, virological confirmation of rubella is most frequently required when a pregnancy is involved. The relationship between rubella infection in pregnancy and fetal damage is widely known, and because of the need to prevent pregnant women contracting the disease, immunization programmes have been introduced. Live attenuated vaccine is offered to all girls between their 11th and 12th birthdays, also to any woman found to be seronegative antenatally when it is given early in the post-partum period. To try to assess the extent of the problem, results of rubella haemagglutination inhibition titres at various ages and of different populations were studied. It was found that prior to the introduction of the immunization programme, 30% of children aged 10 to 15 years were still susceptible to rubella and 12% of the antenatal population. Rubella vaccine has had little effect upon the antenatal population results. This means that there is still a need for rapid serological diagnosis of suspected rubella in early pregnancy. One year's results using haemagglutination inhibition and complementary fixation titres supplemented by sucrose density gradient centrifugation and 2 mercapto-ethanol reduction for the detection of rubella IgM antibody are presented.

Measurement of Plasma Volume using Human Serum Albumin labelled with Technetium

A. M. HOLROYD, A. C. LAWRENCE, C. PARKER, AND M. DAVIES (*Haematology Department, Northern General Hospital and Medical Physics Department, Weston Park Hospital, Sheffield*) A standard technique for measurement of plasma volume using radio-iodine-labelled human serum albumin (¹²⁵I HSA) has been compared with the same method using human serum albumin labelled with technetium (^{99m}Tc HSA) Beazley *et al.*, 1968).

The plasma volume has been measured simultaneously using two isotopes and differential counting in five normal subjects and eight patients with polycythaemia, myelofibrosis with splenomegaly, chronic granulocytic leukaemia with splenomegaly, or chronic renal



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