

**SEROLOGICAL TECHNIQUE :
IMMUNOTHERAPY (contd.)
IMMUNIZATION AGAINST VIRUS INFECTIONS**

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OTHER VIRUS DISEASES* : I. TYPHUS

FORMOLIZED suspensions of ground-up mouse lung, advocated by Durand and Giroud, have been used for active immunization. They are easier to prepare than the suspensions made from the gut of infected lice, advocated by Weigl.

Cox's vaccine is made from rickettsiæ grown in the yolk sac of developing chick embryo. Large-scale production is possible. This vaccine preserved with 1 in 10,000 'merthiolate' and 'a trace of formalin' has been used in Great Britain. It is stored at 2°C. to 4°C. The primary course consists of 3 doses of 1 cc. each given weekly. The immunity is short-lived. 'Boosting' doses are recommended whenever an outbreak of the disease is suspected or at the beginning of the season, associated with this disease. The reaction, local or general, is insignificant. Allergy against egg or chicken may cause a reaction and must be excluded by history. It is amenable to adrenaline. *The remarks concerning allergy and its treatment apply to all vaccines made from cultures grown in eggs.*

The vaccine is used against Murine or Flea Typhus also.

A similar vaccine from yolk sac cultivation has been prepared against Scrub Typhus.

II. INFLUENZA

Three strains of the virus are known : Virus A, Virus B and Virus Y (a group of several viruses). They are cultivated in allantoic fluid of the chick embryo. The work is still in the experimental stage for application to man. A vaccine has been prepared from virus A which is considered the most important. It is given in a dose of 1 cc. in the beginning of the cold weather. Another similar dose is given 2 or 3 months later. There is no cross-protection between the viruses.

Passive immunization has been accomplished by inhalation of fine sprays of horse immune serum.

The strains described are epidemic strains. The pandemic strain of 1918 notoriety was not collected.

Incidentally, the epidemic now sweeping North England is known as the Scandinavian 'flu'. Its virus is mild though highly infectious. The exaggerated reports in the daily press of its ravages have been discounted by the English Ministry of Health.

Incidentally again, the influenza bacillus of Pfeiffer, *Hæmophilus influenza*, has nothing to do with the genesis of the disease.

* Including rickettsiosis.

III. YELLOW FEVER

Virus 17D., a pantropic strain (instead of the original neurotropic strain), is used in preparing a live vaccine. The virus is grown in chick embryo which is ground up for the vaccine. The latter is then frozen, dried *in vacuo* and stored between 0 and 4°C. It is reconstituted with cold sterile normal saline for use.

The vaccine is pathogenic for the mouse and this fact provides the dose : 500 to 1,000 mouse doses are used for an immunizing dose which is contained in 0.5 cc. Only 1 injection is necessary. Children under 2 years of age receive half the dose. Immunity is established in 10 days and lasts 4 years.

No reaction, local or general, is usually observed. Allergy to hen's egg and proteins must be guarded against.

Inoculation is the only protection against Jungle Yellow Fever.

As mentioned before, a primary vaccination for small-pox and an inoculation for yellow fever should be well spaced. The inoculation should not be given within 14 days before or 21 days after a primary vaccination.

IV. MEASLES

There is no practicable method of producing active immunity apart from the actual infection.

Convalescent serum, normal adult serum and plasma globulin concentrates (especially fraction II which consists of all the gamma and much beta globulin) which are used in suppressing the disease can also be used in attenuating the disease and thus producing immunity.

One of the following procedures is usually employed :—

1. Convalescent serum 5 cc., within 6 days of exposure, for children under 3 years of age. For older children the dose is doubled.

2. Adult serum (supposed to contain antibodies against measles, because of infection and recovery in childhood) 10 cc. within 6 days of exposure for children under 3 years of age. For older children the dose is quadrupled.

3. Globulin concentrate 0.5 cc. within 7 days of exposure given to children under 6 years of age. It protects completely 50 per cent cases and modifies the disease in the other 50 per cent.

For attenuation and consequent active immunization (1) and (2) may be given later than 6 days after exposure, or half the amount may be given within the 6 days.

Globulin concentrates are now likely to be used for cure in the established disease. They should be available from up-to-date blood banks.

V. GERMAN MEASLES

The recent observation that expectant mothers contracting the disease give birth to deaf

children (who become deaf-mutes) has focused attention on this otherwise the tamest of infectious fevers. Other congenital defects, like heart defects and cataract, have also been ascribed to German measles attacking an expectant mother during the first 3 months of pregnancy.

Girls should have German measles, when possible, before the child-bearing period. A pregnant woman (who has not had the disease before) should not be exposed to the infection and should be kept out of an area where cases have occurred. If she has been exposed, globulin concentrate should be used in suppressing the disease.

A Mirror of Hospital Practice

STREPTOMYCIN IN BILIARY TRACT INFECTION

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STREPTOMYCIN, when parenterally administered, is partially excreted and concentrated in the bile (Zintel *et al.*, 1945), and in this way it can be effectively used in any infection of the biliary tract by streptomycin-sensitive organisms. In the transient jaundice of infective hepatitis, a viral infection, streptomycin is of no use. But in the case reported below, where the jaundice was probably due to a low-grade infection of the biliary tract, this drug had a very favourable effect on the course of the disease.

Case note.—B. D. G., aged 25 years, male, had an attack of jaundice in April 1949, and the onset of the disease was with indigestion, acidity and loose stools. It was thought to be an attack of infective hepatitis by the attending physician who treated him for the following three months. But the jaundice did not clear up during this period and the patient was admitted to the hospital on 25th July, 1949, as an intractable case of infective hepatitis. On admission, he looked ill and emaciated with moderate jaundice. Temperature was 99°F. Liver was 8 cm. below the costal margin, with a rather irregular firm surface but no tenderness. Gall-bladder region was not tender. Spleen was just palpable. No other abnormality.

Laboratory findings.—Stool showed no abnormality, colour was light yellowish. Urine contained bile pigments but no bile salt. W.B.C. 13,300 c.mm. with polymorphonuclear cells 70 per cent. Van den Bergh test, direct—positive and bilirubin content 5.6 mg. per cent. Total protein 6.2 gm., albumin 2.2 gm. per cent, globulin 4.0 gm. per cent. W.R. negative. A straight skiagram of the gall-bladder region showed no radio-opaque calculus. Gastric analysis showed low acid curve.

Progress of the case and treatment.—He was provisionally diagnosed to be a case of infective hepatitis, an obstinate one and progressing towards sub-acute nodular hyperplasia of the liver. Ordinary supportive treatment was given including good diet containing moderate protein and carbohydrate and low fat. Glucose 25 per cent 25 ml. with vitamin C 100 mg. and calcium gluconate 10 per cent 5 ml. intravenously daily along with a cholagogue mixture and occasional cathartics were given. Afterwards, intravenous liver extract (intra-hepatal), 30 ml. in all, was also administered. The condition of the patient however remained more or less unchanged during the following two months, and the result of the van den Bergh test was as follows—

Date		Bilirubin content (mg. per cent)
2-8-49	.. Direct + ve	5.6
9-8-49	.. "	4.5
23-8-49	.. "	4.0
6-9-49	.. "	4.0
15-9-49	.. "	3.8
24-9-49	.. "	5.0

Throughout the period of illness the patient was generally afebrile with occasional slight rise of temperature. On 24th September, 1949, the white cell count was found to be 16,000/c.mm. and thereafter he had slight rise of temperature ranging from 99°F. to 100°F., most of the days. Because of the fact that the degree of jaundice remained almost the same even after two months of treatment in the hospital (and five months in total) and that he was having occasional rise of temperature with high leucocytic count—an unusual feature for infective hepatitis, it was thought that the jaundice might be due to some low grade bacterial infection of the biliary tract. At this stage, he was given streptomycin 0.5 gm. twice daily for 20 days from 7th October, 1949. Soon after the administration of streptomycin, the jaundice began to clear up and on 14th October, 1949, *i.e.* after 7 days of streptomycin, bilirubin content was only 2 mg. per cent and after the completion of the course (20 days), van den Bergh test became negative. The general condition of the patient also improved and *pari passu* with it the size of the liver also retrogressed and he was discharged on 27th October, 1949. He has been under our observation for the last one year (last examined on 10th October, 1950) and except for a palpable liver is quite well now.

Comment.—In this case, the jaundice was probably due to cholangitis caused by some streptomycin-sensitive organism and there was no improvement with ordinary treatment for infective hepatitis. Streptomycin had a rapid response and the jaundice disappeared in no time.

Recently Rao (1950) treated with streptomycin three cases of infantile cirrhosis (with