VACCINATION AGAINST TYPHUS FEVER

BY

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The incidence of agglutinins for *Proteus* OX 19, OX 2, and OXK in the British population has rarely been investigated. It was reported in the Monthly Bulletin of the Emergency Public Health Laboratory Service (Aug., 1942, p. 6) that in 100 "normal" sera no agglutination was obtained with any of the three suspensions above 1/128 dilution. The titres for OXK were approximately double those found for OX 19 and OX 2, and it was suggested that titres of 1/80 or over with OX 19 are unlikely "in the absence of exposure, either recent or remote, to typhus infection." Approximately nine-tenths of these sera showed a titre of 1/16 or less with the OX 19 and OX 2 suspensions.

There is only one report from this country on vaccination against typhus fever and its effects on the Weil-Felix reaction. Felix (1942), in a report to the Medical Research Council, gave briefly the alterations in the OX 19 agglutinin titre evoked by various vaccines. Considering 100% or greater increase in agglutinin titre as significant, very variable results were found with both the type and the batch of vaccine used. With vaccines of the Cox type the proportion showing a significant rise in titre varied with the batch of vaccine from approximately 5 to 50%.

The Present Investigation

In the investigation now reported a vaccine prepared by the Connaught Laboratories, Toronto, from a European louse-borne strain of *Rickettsia prowazeki* grown in the yolk-sac of chick embryos (Cox, 1938) was used. It was issued on Nov. 4, 1941, and with a batch of vaccine of the same date Felix obtained a significant increase in OX 19 agglutinin titre in about half of those inoculated. Twenty-three public health workers were vaccinated and their Weil-Felix and clinical reactions were investigated. At weekly intervals each received 0.25 c.cm., 0.5 c.cm., and 1 c.cm. of vaccine subcutaneously, and three months later a fourth dose of 1 c.cm. Samples of blood were obtained on four occasions: (1) before the first injection; (2) a fortnight after the third injection; (3) before and (4) a fortnight after revaccination; these were tested for OX 19, OX 2, and OXK agglutinins. The method used in the Weil-Felix test was as follows:

Concentrated suspensions of OX 19, OX 2, and OXK, prepared at the Standards (M.R.C.) Laboratory, Oxford, were diluted 15 times and added in equal quantity to serial serum dilutions, the final dilutions of serum being 1/5, 1/10, 1/20, 1/40, 1/80, 1/160, 1/320, and 1/640, while that of the suspension was 1/30. All tubes were incubated at 56° C. for 4 hours, and the test was read after standing at room temperature overnight; the last tube showing standard agglutination was taken as the titre.

Before vaccination the titres for OX 19 and OX 2 in the 23 cases were all 1/20 or less, the majority showing no agglutination at 1/5. With OXK, 20 out of the 23 showed titres ranging from 1/20 to 1/160, the commonest being 1/40. No higher titre was observed.

Relation of Agglutinin Titres at Various Stages to the Number of Cases

Suspensions	Titre	Before Vaccination	Number of Cases		
			2 Weeks After Vaccination	3 Months After Vaccination	2 Weeks After Revaccination
OX 19	0 to 1/10	20	10	15	4
	1/20 to 1/160	3	13	8	19
OX 2	0 to 1/10	22	13	21	11
	1/20 to 1/80	1	10	2	12
OXK	0 to 1/40	15	1	21	18
	1/80 to 1/640	8	22	2	5

Vaccination in the majority of cases resulted in an increase in titre of the three agglutinins. Three months later they had decreased, but not to the pre-inoculation level. After revaccination the OX 19 and OX 2 agglutinin titres rose again, the

former above and the latter to the level recorded after primary vaccination, while the OXK titres were not appreciably altered. These results are tabulated below by correlating the number of cases with the agglutinin titres of their sera.

Even after revaccination the highest OX 19 agglutinin titre was 1/160 (1 case), and OX 2 was 1/80. If more than 100% increase in OX 19 agglutinin titre is taken as significant, 14 cases out of 23 (61%) showed it after primary vaccination and 17 (74%) after revaccination.

Reactions to the injections were as a rule quite slight, and diminished in severity with each additional injection. General reactions, such as occasional malaise, headache, drowsiness, and muscular pains, were less frequent than local reactions, which presented as areas of erythema, swelling, and stiffness, usually starting 12 to 24 hours after the injections and lasting a day or two.

Summary

Twenty-three people were vaccinated with a Cox vaccine against typhus fever and revaccinated three months later.

The Weil-Felix reactions on these individuals showed low normal agglutinin titres, which were increased after vaccination, and, in the case of OX 19, after revaccination.

The reactions to the vaccine were slight.

I wish to thank the Medical Research Council for the supply of vaccine and Prof. S. P. Bedson for his helpful advice.

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TREATMENT OF PEDICULOSIS CAPITIS

BY

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Coincident infestation of the skin by *Sarcoptes scabiei* and of the scalp by *Pediculus humanus capitis* has become more common among patients attending the scabies clinic in Birkenhead. From the table given below one can see the steep rise in lousiness recorded in school-children during routine cleanliness inspection; it also gives a fair indication of the increase in lousiness of many families in the borough. It is not an uncommon sight to find children's scalps in an unbelievably filthy condition, with lice present in thousands.

Results of Cleanliness Inspections carried out by the Health Nurses in the Elementary Schools, 1938-43

Year	No. on School Rolls	No. with Nits	No. with Vermin	Total No. Unclean
1938	20,101	2,499	253	2,808 (13.9 %)
1939	19,519	2,781	89	2,959 (15.16 %)
1940	14,989	1,857	146	2,086 (13.92 %)
1941	11,753	1,863	107	2,141 (18.22 %)
1942	14,398	2,412	115	2,871 (19.94 %)
1943 (Jan.-June 30)	14,999	2,420	388	3,026 (20.17 %)

These figures refer to the number on the rolls of the elementary schools at the end of the December term of each year, except in the case of 1939, the figures for which refer to the number on the rolls at the end of the summer term; all schools were closed in the following September owing to the outbreak of war.

Since the publication by J. R. Busvine and P. A. Buxton (*B.M.J.*, 1942, **1**, 464) of their use of lethane oil as a means of controlling head lice, I have employed it at the scabies clinic with excellent results so far as the killing of lice is concerned, but it leaves much to be desired regarding its effect on nits cemented to the hair. It is unfortunate that scabies seldom, if ever, affects the scalp, except perhaps at the nape of the neck, otherwise it would not have been left to me to draw attention to the clinical finding that an emulsion of benzyl benzoate is the treatment *par excellence* for pediculosis capitis even when complicated by impetigo, etc. Its solvent action on the cement of the nit and its lethal action on the louse make it a very quick and effective remedy in "delousing."

One must emphasize that it is necessary to use a non-irritating formula of benzyl benzoate emulsion, as the majority

of the emulsions tried first at the clinic were too painful for the patient. However, the latest formula of ascabiol can safely be used twice daily for three or four days, though I have seldom found it necessary to treat for more than three days. This is a most important matter, as unsuitable emulsifying agents in the benzyl benzoate preparation will soon cause sore scalps and poor results. The action on the nit is a "combined operation," because, used alone, neither benzyl benzoate nor the emulsifying agent gives the desired result; nor does their use as separate solutions applied one after the other on the same or different days.

Method

All the experiments carried out were designed to remove the nits from the hair without the usual tedious work of combing. At first hairs were removed and put into sealed tubes to act as a control for the viability of the nit. This practice was discontinued when it was realized that the object of the experiment was not to determine whether the nit was dead or alive but to discover an easy method of freeing the scalp from nits about whose viability one could never be sure. The results were briefly as follows, after applying the four undermentioned solutions:

Solutions used	Effect on Nits attached to Hairs 24 Hours Later
1. 25% benzyl benzoate dissolved in industrial spirit	Nits still remain adherent to hairs
2. Emulsifying agent (triethanolamine stearate)	No apparent effect on nits
3. Ascabiol (new formula)	Nits loosened; removed by simple wash with soap and water
4. Lethane oil	Nits appear more strongly attached to hairs than before

The effect of ascabiol emulsion is superior to that of lethane oil, as the lice appear to be dissolved in the solution.

The severe cases of infestation with *Pediculus capitis* in which coccal infection had occurred with much crusting of scalp and enlargement of the post-cervical glands were treated daily with the ascabiol. Most of the scalps were clean and healed in less than a week. I do not know of any other form of treatment which gives such quick results, despite the trial in hospital of numerous preparations over a period of many years, with both in-patients and out-patients.

For those wishing to carry out this method of treatment—which is now my routine for all scalps infested with (1) nits only, (2) lice and nits, (3) lice, nits, impetigo, etc.—I have given the technique used at the scabies clinic, where these experiments were carried out by myself and the nursing staff. This method has relieved the staff from the tedium of fine combing: simple washing with soap and water was sufficient to remove all remaining nits.

Routine Treatment now used

First day: Head coated with ascabiol (new formula); application made with painter's brush 1½ in. or 2 in. wide.

Second day: Hair washed with soap and water.

One week later: Head inspected carefully for possible reinfection.

If the infestation is a very heavy one this treatment is given twice in 24 hours. If there is coincident coccal infection of the scalp the treatment is repeated on the second and third successive days; then one of the common forms of healing ointment is given until the inspection of the scalp one week later. Ointments in use are mostly preparations of sulphonamides in Mumford's base, lanette wax, or vaseline. In cases of seborrhoea, sulphur and salicylate in vaseline are sufficient. As already mentioned, treatment with ointments is seldom necessary.

I wish to thank the medical officer of health, Dr. D. Morley Mathieson, for permission to carry out this work at the scabies clinic; also the nursing staff, whose assistance made the work possible. Messrs. May and Baker kindly supplied the benzyl benzoate emulsion "ascabiol" (new formula) used in these experiments.

L. E. McCrea (*J. Urol.*, 1942, 47, 818), who records an illustrative case, states that congenital absence of the penis is one of the rarest anomalies on record, only ten previous cases having been reported. It must not be confused with pseudo-hermaphroditism, hidden penis, or epispadias. The present case was that of an otherwise normal young man who wished to marry. During sexual excitement the presence of erectile tissue in a small eminence on the perineum was manifested by some enlargement, and on manipulation an apparent ejaculation of semen took place.

Medical Memoranda

Recovery from Actinomycosis of the Liver

I can find no other report of recovery from actinomycosis of the liver, and therefore consider that this case should be put on record.

In Oct., 1928, a hitherto healthy young man began to complain of abdominal discomfort and anorexia. He wasted very rapidly, and by the end of the year was extremely ill. His conjunctivae turned yellow, and on examination a large epigastric mass was discovered. In Feb., 1929, he was operated on at Swansea and a portion of the tumour was removed for microscopical examination. After the operation the surgeon informed the patient's wife that there was a tumour of the liver "as big as my two fists"; that he thought it was malignant; and that he was afraid her husband had but a short time to live. Two months later the tumour had completely disappeared and the patient seemed perfectly well. Now, 15 years later, at the age of 46, he has just been passed for insurance purposes as a first-class life.

The report on the section was "actinomycosis of the liver." Because of an article of mine which was published in the *B.M.J.* of Feb. 23, 1939 (p. 347), the patient was treated with 5-minim doses of tr. iodi sine iodidi 3 times a day in milk, and in April of that year he was sent by Dr. Taylor of Swansea to see me for my opinion as to whether the treatment should be continued longer. As a precautionary measure I advised him to take one dose daily for a further 6 weeks.

Bristol.

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A Case of Congenital Microcolon

Cases of microcolon in the literature stress the extreme rarity of the condition. Theremin (1877) recorded two cases in 111,451 necropsies in Vienna. Greig (1925) reviewed the literature of the condition and published three cases in which the entire colon was diminutive, and in which there were, in addition, abnormalities in the small gut. The case here recorded is one in which only part of the colon was affected, and is comparable to two cases reported by Klippel and Feil (1912) and Lesné and Baruk (1923).

CASE HISTORY

The patient was a male first-born infant of 5½ months. Both parents were young and healthy. At the age of 6 weeks the child had a mild skin eruption, which was followed by an attack of acute gastro-enteritis; these responded to treatment. A month later the patient developed acute bronchitis and enteritis, and again recovered. The final illness began with a recurrence of the bronchitis, which progressed to bronchopneumonia with a left-sided empyema. During this last illness the abdomen showed gradual and progressive dis-

Photograph showing transverse colon pulled downwards to reveal the transition in size taking place proximal to the splenic flexure. S, Stomach, with omentum removed. C, Transverse colon. M, Microcolon.

tension, which was associated with severe constipation. Repeated enemata produced small results in which the faeces were normal in appearance. Rectal examination disclosed no abnormality. A straight radiograph of the abdomen showed gas distension of the small intestine and the caecum.

POST-MORTEM EXAMINATION

A left-sided empyema was present in association with a small superficial lung abscess; this condition was regarded as the cause of death. The condition of the bowel was of particular interest. The gut was normal in position and fixation. The small intestine was distended, and the distension was more pronounced as the gut was traced distally. The large intestine was distended up to a point