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THE QUESTION OF VACCINATION AGAINST SMALLPOX.

AN ADDRESS DELIVERED BEFORE THE NORTH LONDON
MEDICAL AND CHIRURGICAL SOCIETY ON JANUARY 8,
1930.

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To be or not to be vaccinated or revaccinated, that is the question which we have to discuss to-night. Up to a few years ago the overwhelming majority of the profession, one might perhaps say all, with the exception of a few with a mental twist, would have applauded the witty retort of the late Sir William Osler when twitted by the Editor of the *Journal of the Anti-vaccination League* for his silence on the subject: "I

would like," said Osler, "to issue a Mount Carmel-like challenge to any ten unvaccinated priests of Baal, I will go into the next severe epidemic with ten vaccinated persons and ten selected unvaccinated persons. I should prefer to choose for the latter three Members of Parliament, three anti-vaccination doctors, if they could be found, and four anti-vaccination propagandists. I will make this promise: Never to jeer nor to gibe when they catch the disease, but to look after them as brothers, and for the four or five who are certain to die I will try to arrange the funerals with all the pomp and ceremony of an anti-vaccination demonstration."

What then has given rise to the change in our attitude to vaccination against smallpox? The answer is two principal facts. The first is the extraordinarily mild character of the prevailing epidemic of smallpox in this country, as shown partly by the low

mortality and partly by the infrequency of complications of any importance. The second fact is the occurrence of a new and highly fatal, though undoubtedly rare, sequela of vaccination. As regards the first point, Dr. G. F. Buchan, the Medical Officer of Health of Willesden, in a recent discussion at the Society of Medical Officers of Health pointed out that smallpox now causes fewer deaths than either chickenpox or mumps, and supports this at first surprising statement by the fact that during the decennium 1917-1926 there were only 142 deaths from smallpox in England and Wales, as compared with 596 deaths from chickenpox and 287 from mumps during the same period. Since 1922, when it was 2·27 per cent., the case mortality of smallpox has never been as high as 1 per cent., but has ranged between 0·27 and 0·11 per cent., whereas in the last great London epidemic of smallpox, in 1901-2, in which I was a medical officer, the mortality for the years 1901 and 1902 was 14·74 and 16·89 per cent. respectively. A similarly low mortality to that attending smallpox in England to-day occurred in the epidemic in Switzerland during the years 1921-1926, when of 5,560 notified cases only 15 were fatal, and in the Island of St. Miquel in the Azores, in 1923, when there were over 15,000 cases with only 10 deaths in a population of 126,000 (Sobernheim).

The extremely mild character of smallpox in this country to-day has indeed led to doubts being raised as to whether the disease really is smallpox, and consequently whether the usual strict measures of isolation and quarantine should be enforced.

The view generally accepted, however, is that the mild form of the disease to which the dualists have applied the term parasmallpox, or alastrim, is merely modified smallpox caused by a more or less transformed variolous virus. Sobernheim has suggested that at the commencement of the series of variations is a virus diminished in virulence but otherwise typical which produces epidemics of ordinary smallpox, of

which the only exceptional feature is the uncommonly low mortality. As the result of further modification of the virus, qualitative changes also may occur, finally giving rise to the so-called alastrim. Even more important than the question of the weakening of the virus is that of the persistence of the loss of virulence. Concurrently with a benign type of smallpox a virulent form with a high mortality may occasionally occur, as was illustrated in Willesden in 1926, in Hendon in 1927, when the mortality was 45 per cent., and in the Basle canton in the Swiss epidemic, when 7 out of 44 cases were fatal. It is possible that in such cases the organism of virulent smallpox has been introduced from an external source, as was recently exemplified in the cases reported from India in the "Tuscania" when, according to the Ministry of Health Report, 11 out of 53 cases died.

It is noteworthy that there has recently been a mild epidemic of smallpox in Holland (especially at Rotterdam and Delft), where, owing to the somewhat heavy incidence of post-vaccinal encephalitis, much fewer vaccinations had been performed during the first half of 1929 (Kuenen, Kuiper and van Loghem). The epidemic was at first regarded as alastrim, owing to its mild character, but subsequently some fatalities occurred, so that the mortality of 5·4 per cent., though comparatively low for smallpox, was much higher than that of the disease seen in this country at present.

According to the current (November) issue of the Monthly Epidemiological Report of the Health Section of the Secretariat of the League of Nations, the incidence of smallpox in most European countries at the present time is nil or negligible. There are, however, two remarkable exceptions, one being this country and the other the Union of Soviet Socialist Republics. But whereas in Soviet Russia, where the efforts of the Health Service in combating infectious diseases, alcohol and other narcotic poisons demand our admiration, the number of cases

of smallpox has been rapidly decreasing since 1920, when compulsory vaccination was introduced—in this country, owing to neglect of vaccination, smallpox has increased from 280 cases in 1920 to 12,420 in 1928. According to Dr. Brincker, the senior medical officer of the Public Health Service of the London County Council, London is at present an unvaccinated community, at least 75 per cent. of the school children being unvaccinated. It is not, therefore, surprising that there were 418 smallpox patients under treatment at Joyce Green Hospital (M.A.B.) last Monday, January 6, 1930.

The second point with which I have to deal is the occurrence of certain nervous sequelæ of vaccinia which usually assume the form of encephalitis, but sometimes may be manifested by meningitis, myelitis, polyneuritis or optic neuritis. The great majority of cases have occurred in England and Holland and comparatively few in other countries. According to the most recent information published in the October issue of the Monthly Epidemiological Report of the Health Section of the League of Nations, from December, 1922, to June, 1929, inclusive, 175 children in England developed some nervous disease within the four weeks following vaccination and 91 died. It is true that during this period $5\frac{1}{2}$ million vaccinations were performed in this country, so that the proportion of cases with nervous sequelæ was 1 to every 33,000 vaccinations, and of deaths 1 to every 60,000 vaccinations.

According to Dr. Jitta, President of the Dutch Health Office, 146 cases, of which about a third were fatal, occurred in Holland between 1923 and January 1, 1929, or about 1 case to every 5,000 vaccinations.

Eckstein has recently collected 92 cases which have occurred in Germany since 1912, and Netter has collected 21 cases which have occurred in France between October, 1926, and June, 1929.

On the other hand, according to the report published in the *Bulletin d'Office Interna-*

tionale d'Hygiène Publique of July, 1929, no case of post-vaccinal encephalitis has yet occurred in Jugo-Slavia, Roumania or Soviet Russia, in spite of the vast number of vaccinations which are being performed in these countries. It is noteworthy that while in England and Holland post-vaccinal encephalitis has been most prevalent in villages and rural populations of definitely restricted areas, in Germany the larger towns have paid a heavier tribute than the smaller districts.

Although Sacco is said to have described nervous symptoms following vaccination a hundred years ago, Sir George Buchanan draws attention to the fact that in the Report of the Royal Commission on Vaccination of 1889-1897 no allusion was made to cerebral sequelæ. Comby, of Paris, described a case of encephalitis following vaccination in 1905 in a paper on acute encephalitis in children, but the first detailed account of a number of cases with histological examination of the nervous system was given by Dr. H. M. Turnbull, of the London Hospital, who observed the first cases in 1912, but did not publish his observations till 1926, in conjunction with Dr. J. McIntosh.

The importance attached to the occurrence of post-vaccinal sequelæ has led within the last seven years to the formation of three successive committees to study the subject. The first was the committee appointed by the Ministry of Health, under the chairmanship of Sir Frederick Andrewes, in November, 1923, whose report was published in 1925. The second was appointed by the Ministry of Health in conjunction with the Medical Research Council in May, 1926, under the chairmanship of Sir Humphry Rolleston, and published its report in July, 1928, and the third was a committee of the League of Nations which made its report in the same year. All the committees seem to have been agreed (1) as to the rarity of post-vaccinal encephalitis; (2) as to the fact that it is not a mere coincidence; (3) that post-vaccinal

is distinct from lethargic encephalitis; and (4) with the exception of Dr. J. McIntosh, that the vaccine virus is not solely responsible for the condition.

The nervous sequelæ cannot be attributed to any particular lymph, as they have followed the use of lymph of all kinds and from all sources. The encephalitis which usually develops in nine to fifteen days after vaccination was at first thought to be merely epidemic encephalitis occurring in recently vaccinated subjects, but it was subsequently shown that there were important clinical and histological differences between the two forms of encephalitis. Clinically, post-vaccinal encephalitis differs from epidemic encephalitis in the greater uniformity of symptoms, the shorter duration of the acute stage, the absence of paralysis, especially of the eye muscles, the presence of Babinski's sign, which is very seldom found in epidemic encephalitis, the extreme rarity of residues, mental or physical sequelæ being but rarely observed in cases which recovered, and the much higher mortality. The characteristic histological changes which correspond to those met with in encephalitis following the acute exanthemata, especially measles, consist in the presence round the vessels of the central nervous system of an area of demyelination. Moreover, the lesions are not as in epidemic encephalitis confined to one area, but are generally distributed throughout the brain. Although a few cases have followed revaccination, the great majority have occurred only in connection with primary vaccination and in children of school age. Thus, out of fifty-nine cases of post-vaccinal encephalitis recently reported in Holland between the beginning of August and October 5, 1929, forty-five followed primary vaccination and only fourteen revaccination. It should be noted that revaccinations at that time considerably outnumbered primary vaccinations, as 146,787 of the former as compared with 8,239 of the latter were carried out at the Rotterdam vaccine institute from July 28

to September 29, 1929, and the proportion was probably the same in private practice (Netter). The rarity of post-vaccinal encephalitis during the first year of life is shown by the fact that only nine out of ninety-three English cases and five of 146 Dutch cases were under 12 months, the great majority being of school age. In 70 per cent. of the cases the symptoms appear between the tenth and thirteenth day after vaccination, when the latter is at its height. The four principal symptoms are fever of 104° F., or higher, vomiting, headache and stupor or coma (Armstrong). Meningeal symptoms are usually absent in conscious cases. Convulsions are common in children. Trismus has been occasionally observed and led to the mistaken diagnosis of tetanus, and indeed it is possible that some of the cases regarded as post-vaccinal tetanus were really examples of encephalitis.

The eye muscles usually escape. Apart from slight increase in its pressure and occasional increase in the cell-count, the cerebrospinal fluid shows little or no change. Death, which takes place in 30 to 40 per cent., usually occurs three to ten days after the onset. Recovery in the rest is usually rapid and complete.

We have still much to learn about post-vaccinal encephalitis; for instance: (1) its exact nature; (2) why it is so much more frequent in some countries than in others in which it is almost or entirely unknown; (3) an effectual method of prophylaxis and treatment.

There is no doubt, however, that post-vaccinal encephalitis is rare, as the figures which I have quoted show.

Although I have been familiar with the British and foreign literature of the subject for some time, and since 1926 have drawn attention to it each year in the *Medical Annual*, I have never actually seen a case myself.

In view of the fact that the nature of post-vaccinal encephalitis is not yet fully understood, a satisfactory method of prophy-

laxis and treatment has naturally not yet been realized. In the meantime it has been thought advisable that the operation of vaccination should be carried out with as little trauma as possible.

The Rolleston Committee has therefore recommended that in place of the officially advocated four insertions, trial should be made of vaccination and revaccination in one insertion only, with a minimum of trauma, and that multiple scarification and cross-hatching should be deprecated. The Committee also advised that vaccination should be performed in infancy between the ages of 2 and 6 months, and that revaccination should be offered when a child enters school (5 to 7 years) and again on leaving (14 to 16 years). As is well known to you all, the usual site for vaccination is just over the insertion of the deltoid, but, as I have remarked elsewhere, the site which I prefer is that recommended by Goldberger, on the inner and back side of the arm, for the following reasons: (1) There is little or no exposure to infection from external sources; (2) the chances of trauma are minimized; (3) no infiltration, extensive induration, sloughing or extensive or obvious scarring results. The technique is as follows: After the arm has been cleansed in the usual way, the forearm is flexed at right angles to the arm and the vaccine is applied midway between the internal condyle of the humerus and the anterior axillary line.

An excessive reaction can be prevented by dilution of the lymph, which, according to Bedson, has been carried out at the London Hospital during the last three years with good results on 700 persons, the dilutions varying from 1 to 50-fold.

The intracutaneous method recommended by some authorities is not in my opinion advisable. According to Kirstein and Hunaeus, who carried it out on sixty-two healthy children, it is more difficult, takes longer to perform, and is more painful than the ordinary method, while the trauma and risk of secondary infection are also greater.

These advantages far outweigh the avoidance of a scar, for which it has been recommended.

As regards the treatment of post-vaccinal encephalitis, Sir Thomas Horder in this country, and Hekman in Holland, have derived benefit from one or more injections of the serum of the patient's father or mother who had been vaccinated with the same lymph without any ill-effects.

Since 1926, Dr. Aldershoff, Director of the Dutch Serological Institute at Utrecht, has prepared a serum from sheep immunized against vaccinia, for which he claims success. It is issued free to medical practitioners on application.

In comparison with encephalitis and other nervous phenomena, all the other complications and sequelæ of vaccination, as met with in this country at least, fade into insignificance. Various transient rashes, of which erythema and urticaria are the commonest, and hæmorrhagic eruptions the rarest, are occasionally met with. Local complications due to mixed or secondary infections may develop in the form of impetigo, furunculosis, erysipelas, cellulitis and gangrene, but since the introduction of calf-lymph have become very uncommon.

Post-vaccinal tetanus, which is much commoner in the United States than in any other country, tends to follow severe primary vaccination performed with large insertions and dressed with a shield and covering attached to the skin. According to Armstrong, of the United States Public Health Service, a vaccination in which the insertion is not over $\frac{1}{8}$ in. in its greatest diameter, treated without shields or dressing strapped to the site, has never been followed by tetanus. Vaccinal syphilis, of which epidemics used to occur when arm-to-arm vaccination was employed, is now only of historical interest, being unknown with the use of calf-lymph.

Generalized vaccinia is a very rare condition, of which I have never seen an example, its frequency being estimated at about 1 in 100,000 vaccinations. It usually

runs a mild course, but when associated with other skin diseases, especially eczema, prurigo or impetigo, it tends to be much more severe and even fatal.

In this connection mention should be made of accidental vaccinia which is likely to occur in persons in charge of recently vaccinated children, as the result of unintentional inoculation. The face, lips and eyes are the most frequent sites, but many examples have been published of the mouth, throat and vulva having been attacked, so that the disease may be mistaken for diphtheria, syphilis or soft chancre. Serious results are particularly liable to arise when persons suffering from a skin disease become inoculated in this way. The unusual severity of accidental vaccinia in such cases has been attributed to the following causes: (1) The patients are not protected by previous vaccination; (2) the human lymph with which they are inoculated is more virulent than calf-lymph; (3) the lymph inoculated into the eczematous area reaches the circulation quicker than when vaccination is performed in the usual way through the healthy skin.

What then is the conclusion of the whole matter? Are we to abandon vaccination owing to the risk of encephalitis? My answer is a most emphatic No! While it is a mistake to deny, as some persons are inclined to do, an ætiological connection between vaccination and encephalitis, yet the risk, as I have shown, is very small. Refusal to vaccinate against smallpox may be compared to refusal to give antitoxin to a person suffering from diphtheria, because sudden death has been recorded after its use, though I admit that such cases, of which I have never seen an example, are even rarer than post-vaccinal encephalitis.

There is always the possibility of the introduction of a virulent strain of smallpox into the country, as in the case of the "Tuscania," to which I have already alluded, or to the occasional occurrence of virulent cases from some unknown cause. It is therefore necessary to be protected, not only

against the prevalent mild type, but also against the possibility of a virulent infection.

Were I, after an unproductive interval of nearly seven years, to have an addition to my family to-morrow, I should not hesitate to vaccinate the infant, like my other two children, by Goldberger's method within three months of its birth, though in deference to the recent recommendation of the Rolleston Committee I should use only one insertion.

About a year ago, when there had been several cases of smallpox in Fulham, I earnestly advised a daily worker in my employ to have her little girl vaccinated, and even enforced my advice by showing her my photographs of smallpox in unvaccinated children taken in the epidemic of 1901-2. The silly woman, however, behaved like the deaf adder of Scripture, and some months later the child contracted smallpox, fortunately of the usual mild type. The parents were punished for their folly by suffering considerable anxiety, inconvenience and pecuniary loss through the quarantine enforced upon them. This incident recalls a somewhat similar experience, related by Professor E. B. Tylor, which my father had at Oxford in the smallpox epidemic of 1871. A poor woman whom he had engaged as a laundress in the smallpox hospital refused to be revaccinated, although he almost went down on his knees to entreat her, her plea being that she had a drunken husband, her family depended on her work, she could not afford to be idle if her arm became swollen and incapacitated after vaccination. So she had her way, caught smallpox and died. My father used to say that he felt he had the guilt of that woman's death on his soul for not having insisted on her being revaccinated.

In conclusion, let me emphasize the importance of the strongest argument in favour of vaccination which has never yet been answered by the anti-vaccination party. I mean the immunity of the well-vaccinated staff of smallpox hospitals. I know of only

one case where a nurse in a smallpox hospital contracted the disease on duty. During the epidemic of 1901, before joining the staff, she had had a severe attack of confluent smallpox by which she was badly marked. A few months after her recovery she joined the staff of the hospital in which she had been a patient, and under the circumstances it was not considered necessary to vaccinate her. As the result, however, of being exposed to a massive dose of virulent infection, she caught a second attack of smallpox, this time of a mild form, shortly after joining.

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LOCAL ANÆSTHESIA IN RECTAL SURGERY.

By W. B. GABRIEL,

M.S.

MANY of the minor rectal conditions can be adequately dealt with under local anæsthesia. By means of the technique described below, full relaxation of the sphincter can be obtained, and any of the following procedures can be carried out with ease and absence of pain:—

- (1) Ligature of internal piles.
- (2) Excision of external piles, whether simple skin tags or thrombotic external piles.
- (3) Removal of simple polypi from the lower rectum.
- (4) Incision of fissures or laying open of short direct fistulæ.
- (5) Excision of tissue for microscopical examination, as, for instance, from a suspected early squamous carcinoma of the anus.
- (6) To permit proctoscopy and sigmoidoscopy when, owing to the presence of a fissure or other painful lesion at the anus, examination would be difficult or impossible on account of pain.

Method.—The solution is a 1 per cent. solution of novocain; it is essential that this should be freshly prepared and sterilized by boiling in a flask over a flame for five minutes. So important is the preparation of the solution that in my hospital work I insist on the solution being dispensed and sterilized on the morning of the operation, and for private work I prepare and sterilize the solution myself an hour or two before it is required. In the average case, 1½ oz. of novocain is required and is poured into a small sterile receiver, six drops of adrenalin solution are then added. The most convenient syringe is a 10 c.c. Record with an eccentric nozzle; two needles are required, a fine hypodermic and a 2 in. No. 20 Record.

With the patient lying on his right side and the knees drawn up, the anus is painted