patient's environmental conditions—including lack of income and the matter of compensation. But in some cases there is another factor which I believe is of greater importance, and that is the difficulty which the patient has, because of his persisting intellectual disturbance, in adapting himself to his normal life, and particularly to his occupation. An example will make clear what I mean.

A butcher, aged 50, had had a serious accident seven months before I first saw him. He said he was unable to attend to his business because whenever he went into his shop he felt "awful," and after a few minutes had a feeling that he simply must get away from it. He complained also of headaches, depression, inability to concentrate, being easily tired, lack of interest, disinclination to meet people; he found it a great effort to write a letter or to make a simple calculation, and his memory was very bad. He had formerly been an active man with a good many interests and many friends, but since the accident had been content to sit about idly, and seemed to have lost all his old interests. One of the reasons why he did not want to meet his former friends was that he had nothing to say to them. There was thus ample evidence of intellectual impairment persisting from the time of the accident. Consider the situation of this man when he goes into his shop. His activities there are very largely habits and reactions conditioned over half a lifetime. But they require memory, judgement, power of rapid calculation, grasp of details—qualities which he no longer possesses in adequate degree. All his strongly ingrained habits and conditioned reactions are frustrated by his persisting mental impairment. Is it any wonder that he feels awful and wants to run away after a few minutes? In the case of an employee the conflict is still greater because of the added feeling of compulsion to do the work.

It is not surprising, then, if true neurasthenic elements are often superimposed on the picture of persisting psychasthenia. In assessing such cases, whether with the neurasthenic element or not, it is important to obtain evidence which will reveal the degree of persisting impairment of the patient's mental activity. Fortunately the prognosis is in general good.

Other Types

The next largest subgroup is formed of those patients in whom a constitutional tendency towards neurosis of the anxiety type pre-exists and the accident serves to precipitate a period of aggravation. They are usually to be distinguished from the last group by their volubility and the multiplicity of their symptoms. Their "headaches" are the typical feeling of pressure on the top of the head or of a tight band round the head, and they are not brought on by stooping and by physical effort as are those of patients who are suffering from organic after-effects of head injuries. Usually the accident has been of a less severe type than in the cases I discussed earlier, and a history of antecedent symptoms of neurosis may be obtained.

Gross hysterical manifestations following injury are, I think, usually the result of pre-existing tendencies, and occur in persons of poor mentality. Minor degrees of hysteria are possibly common, in the sense that a patient may unconsciously take refuge in a continuance of subjective symptoms rather than make the effort to return to the conditions of his normal life or relinquish a claim to compensation.

Then there are those who make the most of their symptoms in an effort to obtain the maximum amount of compensation. We scoff at these, but we must be careful to recognize that the difficulty of obtaining fair compensation gives rise, especially among the working classes, to a great deal of genuine anxiety.

Finally there are cases in which the injury seems to precipitate an attack of depression in a patient whose pre-existing mental constitution was of the cyclothymic or manic-depressive type.

In referring to these latter groups I have stepped on to the verge of a big subject, with which I hope some other speaker will deal—namely, the influence of the patient's individual mental constitution on the symptoms arising in consequence of a head injury.

TREATMENT OF VIRUS DISEASES OF THE SKIN*

BY

R. T. BRAIN, M.D., F.R.C.P.

Physician in Charge of Skin Departments, Royal Free Hospital, and the Hospital for Sick Children, Great Ormond Street, etc.

It is a disappointing fact that our knowledge of viruses and the lesions they produce has not added greatly to our therapeutic efficiency in the management of virus diseases of the skin, especially as the most striking examples of lasting immunity occur in certain virus diseases, and few bacterial diseases exist which will bear comparison in this respect with diseases such as measles, mumps, varicella, variola, and zoster. The latter impressive examples are apt to obscure the fact that, in general, no essential differences distinguish the immunity following virus from that of bacterial diseases and it appears to be most probable that viruses are living agents having many points of close resemblance to the pathogenic bacteria. Similar antibodies are developed in virus diseases, and the presence of these antibodies has been demonstrated by the well-known bacteriological tests of complement fixation, agglutination, precipitation, and neutralization. Specific therapy therefore follows the lines of bacteriological procedure, and would chiefly depend upon the use of vaccines and sera.

Unfortunately experimental and clinical evidence indicates that in many virus infections specific antibodies are practically ineffective when the virus has once reached a susceptible cell. No doubt there are exceptions to this rule, and in 1935 Laidlaw, Smith, Andrewes, and Dunkin demonstrated that an anti-influenza serum had considerable potency therapeutically, even when given to mice two or three days after experimental infection with influenza virus. As a rule, however, unless specific antibodies reach the cell before the invading virus, infection is very likely to ensue, and the use of hyperimmune serum or that of convalescent patients is almost limited to prophylaxis. Similarly the induction of active immunity by living or dead vaccine may be very effective in the prevention of infection but of little or no value when infection has occurred.

The various means of producing active immunity in virus diseases are:

1. Vaccination with living virus:

- (a) Human strains—for example, herpes.
- (b) Modified by animal passage (vaccinia).
- (c) Attenuated by time or temperature (rabies).
- (d) Neutralized with immune serum (distemper).

* Read in the Section of Dermatology at the Annual Meeting of the British Medical Association, Belfast, 1937.

2. Vaccination with killed virus:

Heat, formalin, or phenol, and a further modification of virus absorbed on inert protein or other material.

Herpes and Zoster

Let us consider what has been tried and what accomplished in the treatment of skin diseases due to viruses: first, in the case of herpes. Andrewes and Carmichael (1930) demonstrated the presence of antibodies in all of seven cases of frequently recurring herpes, and they made the observation that in some obscure way herpes can occur in man despite the presence of antibodies in the serum. This finding was confirmed by a different test (Brain, 1932); specific herpetic antibody was found in thirty out of thirty-two individuals who were subject to herpes, and in two cases of recurrent herpes repeated tests showed the constant presence of antibody. It was thought that a transient local lesion like herpes could scarcely account for the persistence of antibodies in the serum, and it seemed probable that these patients were carriers of the virus, for there is some evidence that such carriers exist.

Apparently when the antibody content of the serum is below a certain level active herpetic lesions can occur. In some cases it would seem that a second infection, such as pneumonia or the common cold, renders the patient susceptible to the herpes virus already present. It is reasonable to suppose, therefore, that if the antibody content of the plasma can be raised above a certain threshold the herpetic virus will be unable to produce active lesions. Two methods of raising the antibody titre have been employed. Hruszek (1933) claimed a high percentage of success by vaccinating patients with the vesicular fluid of their own early herpes lesions. In 1936 I described a more cautious method in which a formalized 10 per cent. suspension of herpes-infected pads of guinea-pigs was used, and very successful results were obtained in a few cases of frequently recurring herpes, although some cases did not respond at all. With Hruszek's method it is sometimes difficult to get positive "takes" from patients' vesicles. Sufficient data, however, are not at present available by which to estimate the relative value of these two procedures.

So, in the case of herpes, specific treatment of some value may be tried, but its success cannot be guaranteed, and such treatment should undoubtedly be reserved for cases of frequently recurring herpes which are not improved by local x rays and general tonics. It might be added that fractional doses of x rays—for example, one-third pastille dose (90 kV, 3 mA, 0.5 mm. Al screen, 120–150 r) repeated at three weeks' interval, for three doses—to a constantly affected site of eruption seem to desensitize the skin and often prevent or mitigate the severity of the subsequent lesion.

In the case of zoster, of course, the eruption rarely recurs, and since the slight warnings of an impending attack are often unappreciated until the eruption appears prophylactic treatment can seldom be attempted. No doubt zoster convalescent serum would be of considerable use if it could be given three or four days before the eruption occurred, but for the reasons stated this is usually impracticable. When the disease is manifest specific treatment is unlikely to avail, and perhaps the two most successful treatments are posterior pituitrin extract by injection and sodium iodide in large doses by mouth or intravenously. Unfortunately, the extreme variation in severity and duration of the attacks of shingles

makes it very difficult to assess the value of any therapeutic measure, but impressive results have been recorded after the use of these drugs.

Warts and Molluscum Contagiosum

With regard to warts and molluscum contagiosum the virus is embedded in the nucleus or cytoplasm of the epidermal cells, and it seems unlikely that the quiet reaction it provokes would account for any significant antibody response on the part of the host or, if such antibodies were circulating in the blood stream, that these would be able to penetrate the cell membrane and affect the virus.

I have been unable to demonstrate the presence of antibodies in patients' serum and have had no therapeutic success from injecting vaccines prepared from warts or the lesions of molluscum contagiosum. The spontaneous disappearance of warts is more likely the result of an abiotic change in the virus than of the destruction of the virus by specific antibodies. Of the non-specific methods of treating warts probably paints of various kinds are most commonly employed. A well-known one is 10 per cent. salicylic acid in flexible collodion. Owing to the horny surface of a wart it is essential to use a keratolytic substance, and caustic potash, phenol, and glacial acetic acid belong to this category. A useful combination is the following:

Phenol	...	...	...	...	10 parts
Glacial acetic acid	...	...	...	...	10 "
Salicylic acid	...	...	...	...	10 "
Strong tincture of iodine	...	...	...	...	20 "
Industrial methylated spirit	...	...	...	ad 100	"

Success may often be obtained by constant daily applications of such remedies, assisted by the cautious paring away of the keratin layer. Attention has recently been drawn to successful treatment by covering the warts with strapping, but this method, too, often fails.

In other cases it would appear that warts disappear if mild inflammatory reactions are provoked in their vicinity, and it is quite likely that the success which often follows x-ray therapy is due to this fact. Ionization is another good method which probably acts in the same way; it has proved particularly useful in the case of paronychia warts. The lesions are cleaned with ether and then painted several times with liquor potassae to soften the keratin, remove grease, and increase the conductivity of the skin. The fingers are then dipped in a 1 per cent. solution of magnesium sulphate which is in contact with the anode of a galvanic battery, and a current of 5 to 10 milliamperes is passed for thirty minutes. Dr. Grace Griffith has obtained considerable success with this method in my clinic at St. John's Hospital for Diseases of the Skin. As a rule weekly treatments were given, but in obstinate cases more frequent applications were advantageous.

No doubt the occurrence of spontaneous resolution occasionally accounts for a success claimed by the milder methods of treatment mentioned above. This applies to a greater degree when one considers the general methods employed in the treatment of warts, and the multiplicity of these treatments indicates their unreliability. An old-fashioned remedy is 1 oz. of liquor calcis three times daily, and it has been claimed that magnesium sulphate in doses sufficient to produce three liquid stools a day is often successful. Small doses of arsenic by mouth have been advocated, and a more recent treatment is the intramuscular injection of mercury salicylate. Others prefer pills containing the green iodide of mercury in doses of one-sixth to one grain three times a day. My measure

of success with any of these methods has been so small that spontaneous resolution might easily have accounted for the few cures following internal medication. No mention has been made of the numerous methods of treating warts by suggestion, and although it is admitted that sometimes the results obtained by such means are very dramatic, no reasonable explanation can be given as to how such influences work in a disease so definitely organic; but if the percentage of success could be ascertained it might compare with the incidence of natural spontaneous disappearance.

It is admitted that in some cases nothing short of total destruction of the wart by cautery or CO₂ snow or the removal of the entire lesion by curette will effect a cure.

REFERENCES

- Andrewes, C. H., and Carmichael, E. A. (1930). *Lancet*, 1, 857.
 Brain, R. T. (1932). *Brit. J. exp. Path.*, 13, 166.
 — (1936). *Brit. J. Derm. Syph.*, 48, 21.
 Hruszek, H. (1933). *Derm. Z.*, 68, 27.
 Laidlaw, P. P., Smith, W., Andrewes, C. H., and Dunkin, G. W. (1935). *Brit. J. exp. Path.*, 16, 275.

LYMPHANGIOPLASTY—THE FATE OF SILK

BY

HAROLD HARTLEY, M.D., F.R.C.S.

*Consulting Surgeon, North Staffordshire Royal Infirmary;
 Senior Surgeon, Burslem, Haywood, and Tunstall
 War Memorial Hospital*

With a Note by

R. A. KEMP HARPER, M.B., Ch.B., D.R.

Honorary Radiologist to the above Hospitals

In 1916 I gave an account in this *Journal* of a successful case of lymphangioplasty for brawny oedema of the legs, and wrote: "It is said that, whereas lymphangioplasty gives great relief in the brawny arm of cancer of the breast, in lymphatic oedema of the leg its results have not been satisfactory." Recently the patient I described then came to the Haywood Hospital. It is hoped that the follow-up of the case, with a few remarks about the theory of lymphangioplasty and the fate of silk buried in the human body, may be of interest.

Case Report

As a child, aged 13, in 1901 the patient was scalded on the lower parts of the legs and on the ankles and feet. Healing was very slow, and she was unable to stand for six months, and then had to learn to walk again. From the age of 16 to 21 she had a sedentary occupation as a telephonist. At 23 she became a barmaid, but after two years her legs became swollen, heavy, and painful, and she had to give up her work as it entailed long standing. In 1913, after treatment at two of the best provincial hospitals had proved unsuccessful, she came under my care.

On June 30, 1913, lymphangioplasty by Sampson Handley's method, using No. 12 woven tubular silk, was performed on both thighs and legs at the North Staffordshire Infirmary. The operation is easy, and special instruments are not required. Improvement was slow but continuous, and the legs regained their normal shape. When next seen, in July, 1916, she could walk sixteen miles in a day without any swelling of the legs or discomfort. The case was shown to the North Staffordshire Medical Society three years after operation.

On December 30, 1936, she was seen again as an out-patient because she had bruised her right ankle and a small ulcer which resulted was not quite healed. She is now 49;

and can walk miles; the legs are shapely and quite normal, except for the scarring left by the scalds. The case was shown again to the North Staffordshire Medical Society on December 10, 1936.

RADIOLOGIST'S REPORT

Dr. Kemp Harper reported as follows:

"When this patient was x-rayed faint opaque linear shadows, some fragmented, were seen in the soft tissues in the position where the silk threads were introduced twenty-four years ago. We decided that calcification had occurred in pieces of silk which still remained unabsorbed after this long interval; it was felt, however, that some proof of this was required. As a biopsy was refused by the patient, experiments were made. Long pieces of silk (unimpregnated) were attached to the legs of a subject and films taken; these showed no sign of opaque linear shadows. Similar pieces were then soaked in a weak barium sulphate solution, and areas of density were seen somewhat similar to those on the original films. Silk thread was obtained from the operating theatre of a fairly similar thickness, and this, to our surprise, was quite uniformly opaque. On inquiry we found that the silk had been sterilized in perchloride of mercury, and that the opacity of the silk depended on the length of time it had been in the sterilizing solution.

"As a result of these investigations we feel confident that portions of silk have persisted in the soft tissues for twenty-four years, and these pieces, unabsorbed, presumably as the result of walling off with dense fibrous tissue, are still visible. Two reasons can be advanced for this: (1) that the silk or surrounding layer of fibrous tissue has been rendered opaque by the deposition of calcium; or (2) that mercury has remained in the silk unabsorbed for this length of time. The latter reason cannot be definitely ruled out as injections of metallic substances into the buttocks in cases of specific disease are often seen on x-ray examination of the same region years after such injections have ceased."

Theory of Lymphangioplasty

Brawny oedema is due to lymphatic superadded to venous obstruction. A marshy field can be drained by lines of buried porous pipes, but unfortunately a perforated drainage tube buried in the human body becomes blocked by the organization of cellular elements and the coagulation of fluids which have entered its lumen. Sampson Handley (1908, 1910) made the brilliant and promising suggestion that silk threads would continue to drain by capillary attraction. He showed a section of a silk ligature which had been embedded in the tissues for ten years. "Though eroded at its surface the main substance of the thread is intact. Moreover, leucocytes are evidently unable to penetrate between the fibrils of the silk, for the interior of the thread is entirely free from cellular elements. Nor is there any microscopical indication of the coagulation of the body fluids in the interstices of the silk." Handley thought the capillary power was retained, but the question arises, Is there an impermeable sheath of fibrous tissue around the silk? This is the crux of the whole matter.

Lymphangioplasty was tried, and many early successes in the treatment of the brawny arm of cancer of the breast and in various simple lymphangiomas or oedemas of the arm were reported years ago. But Handley himself suspected that the operation would fail in the leg because it could not provide a motor force which would be able to overcome the full pressure of gravity in the lower limb.

The operation was tried, chiefly in Cairo (Madden, Ibrahim, and Ferguson, 1912), for elephantiasis of the legs, and always failed. The Cairo authorities gave histological details and made experiments, but their cases were not followed up long enough. They found that the trauma of the introduction of the silk and the irritation