at the point where the observed rate of healing intersects the calculated rate.

It will be observed that by this formula it is possible to predict how long a wound will take to heal, provided the area and shape of the wound and the age of the patient are known; and, by comparing the curve of actual measurement at similar *t* intervals, to ascertain whether the adoption of various techniques of treatment is actually effective in reducing the time of healing.

In the cases quoted, in addition to the use of the embryonic tissue extract, I have employed immobilization of the wound-bearing member, since this alone appears to have an influence in inhibiting a flare-up of infection which would interfere with repair; but immobilization alone does not appear directly to influence healing time.

Biological Considerations

Fisher's investigations show that the protein derivative of embryonic tissue is not of the nature of a hormone but exists intracellularly, and experimental and clinical observations indicate that it is present in all embryonic tissue but disappears rapidly with the close of embryonic life. It is permissible to surmise that at this biological epoch, when the passive aggregation of cells which we recognize as an embryo develops to a living entity and acquires individuality, it throws off its dependence upon undifferentiated cell activity and begins to elaborate the ontogenic hormones of its progenitors. Thus, for example, in the mammal the influence of the embryonic protein is replaced by that of the chondrotrophic growth hormone elaborated in the pars anterior of the pituitary body.

Epicutan is a protein derivative of embryonic tissue adsorbed to kaolin powder; the wound is powdered and covered with sterile gauze, and dressed every five days. The value of a preparation which by accelerating healing time will shorten convalescence by one month in three is obvious in the present national circumstances. A series of controlled experiments is being carried out at the Strangeways Research Laboratory, Cambridge.

Summary

The basic work of Carrel in tissue culture is recalled, and the technique employed in clinical experiments is detailed.

Case histories are given which demonstrate marked acceleration of wound healing under the influence of embryonic tissue extract.

The equations and graph curves referable to two of the quoted cases are set out; these confirm mathematically the clinical deductions drawn from these cases.

A note as to the form in which the tissue extract is available commercially is added.

I have already referred to the paper by Erfurth Nielsen, from which much of the technical detail, not to make too fine a point, is "cribbed." My indebtedness to Mr. J. M. Russell, lecturer in mathematics at the Technical College, Sunderland, for his kindness not only in providing the graphs but in instructing and explaining the attendant mathematics to me, I most gratefully acknowledge.

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THE KAHN TEST: A SIMPLIFIED TECHNIQUE

BY

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Many years' experience of this test carried out on upwards of a hundred thousand specimens has convinced me that (1) it can be performed more quickly and easily than as described by its author; (2) it is highly specific and sensitive as controlled by parallel Wassermann tests and clinical observation; and (3) it is not one which can be done by any medical man without previous training. Nevertheless the test is simpler than the Wassermann and requires fewer reagents and controls; the reading is less easy, but this and the technique of setting it up can be mastered in a comparatively short time by anyone of average intelligence. Moreover, it is a more suitable test than the Wassermann where small numbers of specimens have to be examined or where full pathological facilities are not available, and it is of great value as a check on the more complicated complement-fixation reaction. In addition it is particularly useful where a quick result is required: a report can be given within a few minutes after the specimen and necessary control sera have been inactivated.

Procedure

Tubes as described by Kahn himself are used, but ordinary Wassermann racks can replace the special three-tube racks. Instead of numerous finely graduated pipettes all that is required are two quill ones made by drawing out in the flame of a blow-lamp ordinary glass tubing with an external diameter of about 0.8 cm. One of these should be coarse—internal diameter roughly equal to that of the lead of an ordinary pencil—and the other fine. The coarse one should be fitted with a teat, a volume of about 0.15 c.cm. of fluid drawn up into it, and a mark made with a grease pencil at the upper level of the fluid; this is used for pipetting all sera. The fine one is passed through hole No. 54 in a Starrett wire gauge and cut off with a file at the point where it emerges. It will be found that twelve drops of diluted Kahn antigen delivered by holding this pipette vertically are roughly equal to one volume delivered from the coarse pipette. Sixty "drops" are weighed against five "volumes," and the mark on the coarse pipette is altered as necessary until the weights are exactly equal. In the test proper the three tubes used by Kahn are reduced to two—that is, the 1 to 12 and 1 to 6 of antigen and heated serum respectively.

Technique of Test.—Two tubes are used for each serum, including positive and negative controls, and two for antigen-saline controls. Into the back row one drop and into the front row two drops of suitably diluted and ripened antigen are delivered with the antigen pipette; one volume (0.15 c.cm.) of each serum to be tested is then added to each pair of tubes, the pipette being rinsed out two or three times in saline between any two consecutive sera and the same pipette being used throughout. The rack containing the tubes is now shaken for three minutes in the usual way (by hand if no mechanical shaker is available) and saline (roughly 1 c.cm.) added to each tube. Results are read with a hand lens with a magnification of about $\times 6$. For this purpose a slit-lamp as used for the sigma test is most convenient, but any shaded light with a dark background answers the purpose.

The Swedish Health Office has issued a circular warning practitioners to exercise the greatest care in prescribing slimming cures, as their use in many cases has caused digestive and ocular disturbances.

Results

These are recorded as *positive* if both tubes show definite flocculation, *negative* if neither tube shows any appreciable flocculation, and *doubtful* if only one tube shows flocculation; if any doubt arises in regard to any given tube it should be compared with the positive, negative, and antigen control tubes.

It is claimed that the above method compares favourably with that described by Kahn (1928) himself in:

Simplicity.—Only two pipettes are required for a whole batch of tests and two tubes for each serum.

Speed.—Antigen certainly and serum probably can be delivered into the tubes much more quickly.

Accuracy.—Delivering the antigen in a series of drops is at least as accurate as and far less troublesome than the employment of pipettes graduated to 0.0125 c.cm.

Reading of Results.—Few people have sufficiently good eyesight to read results without artificial light and a lens.

Recording of Results.—Each tube is read as positive, negative, or doubtful, and no system of taking a mean of a number of pluses is needed.

Comment

It is not suggested that the Kahn test should replace the Wassermann. As a routine the two tests should be used together; but in small laboratories, and particularly under war conditions, it is useful to have a test which requires a minimum of apparatus, is simple and comparatively fool-proof, and can be carried out by anyone who has had a reasonable amount of practice. The Kahn test as described above fulfils all these conditions and, moreover, is highly specific and has been made as sensitive as is consistent with specificity. It is not recommended for testing cerebrospinal fluids.

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PRIMARY LATERAL SCLEROSIS OF SOUTH INDIA

LATHYRISM WITHOUT LATHYRUS

BY

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Anyone who has the opportunity of working in a large general hospital in South India is bound to be impressed with the large number of unusual cases of paraplegia that present themselves for treatment, but few if any reports on the condition exist in medical literature.

The cases recorded below were all seen at the Madras General Hospital. Whenever possible the patients were admitted so that specimens of cerebrospinal fluid could be examined. Some declined to come into hospital, or after admittance refused further examination, so their case reports are incomplete. The main clinical findings are shown in the table overleaf. In every case a complete neurological and general examination was carried out, and the findings were normal unless indicated as otherwise.

Clinical Findings

The patients were almost exclusively male. This is of significance, as although considerably more male patients present themselves for treatment the proportion is nothing like that indicated here, where only one female is shown.

Further, the patients were almost all between 19 and 45 years old. The type of paralysis seen in a typical case consisted of a spastic paraplegia of the lower limbs, with marked increase of muscular tone, great increase of the deep reflexes and extensor plantar reflex, and often the presence of ankle or patellar clonus. The sensations of the limbs were in no case affected. The impression on first examination was that of a typical pure paraplegia due to a lesion of the pyramidal tracts fairly low down in the cord. However, certain factors in these cases are very abnormal; thus it is seen that in no fewer than twelve of the twenty-one cases the abdominal reflex was present and normal, and in a similar number, though not always the same cases, the cremasteric reflex was also found to be present. It is extremely difficult, if we accept the classical interpretation of neurological signs, to explain this phenomenon; for, though by imagining a lesion in the pyramidal system to be limited to the lowest part of the lumbar enlargement of the cord it is possible to account for the presence of a normal abdominal reflex, it is still unlikely that we would obtain a normal cremasteric response. In Cases 2 and 11, where the disease process had ascended high enough in the spinal cord to affect the deep reflexes of the arm, normal superficial reflexes were obtained in the abdomen. (This matter will be referred to later.)

In considering the differential diagnosis of these cases the usual possibilities could be easily excluded. Disseminated sclerosis, the commonest cause of paraplegia at this age, in spite of the paretic type of gold curve obtained in the cerebrospinal fluid in six of the cases, was first excluded because of the complete absence of cranial nerve involvement and the absence of any intention tremor or other characteristic signs. The possibility of traumatic or granulomatous compression of the cord was excluded in the first few cases by radiological examination, and in later cases by the complete absence of other signs of compression. The possibility of the nerve condition being due to compression of the cord by calcified vertebral ligaments was also excluded. Syringomyelia and amyotrophic lateral sclerosis were excluded by the absence of any sign except the paraplegia. Subacute combined sclerosis of the cord was similarly excluded, and we were left with a diagnosis of some type of "primary" lateral sclerosis.

Erb's Paralysis

Lateral sclerosis was first described by Erb in 1875, and he remarked on the fact that it was equally common in young and old, and that the paralysis was of the upper motor type limited to the lower limbs, unassociated with sensory changes though sometimes preceded by a tingling sensation in the legs. In his first series of twenty to thirty cases there were two which had in addition certain difficulties with micturition. The pathology of the condition was not investigated for some years, and then showed, as would be expected from the symptoms, a sclerosis of the crossed and uncrossed pyramidal tracts.

In 1892 Erb described an exactly similar clinical syndrome, now known as Erb's syphilitic paralysis, which he ascribed to a luetic infection; though, as Fortes and de Magalhaes (1933) point out, Erb based his hypothesis of the syphilitic origin of the syndrome on clinical history and the presence of old penile scars, the far more reliable serological tests at that date not being available. In addition to Erb's paraplegias Strümpell has described a familial type associated with syphilitic infection (Fortes and de Magalhaes, 1933), and Trabaud and Mredde (1932) have reported cases of familial paraplegia with symptoms similar to Erb's paralysis, and to the cases shown in the table, as occurring in Arabs in Syria. Both