quite well until March 14th, 1931, when he was brought up to the casualty department in a marked hypoglycaemic attack (produced by an unusual amount of exercise) in which he almost lost consciousness. He responded quickly to glucose treatment, and, feeling fit, discharged himself on Monday, March 16th. His bowels, which were usually quite regular, were not opened on Monday or Tuesday. On Monday afternoon he felt rather drowsy and went to bed, and took no food or insulin for the rest of the day. He had a poor night and vomited four times. On Tuesday morning he again felt drowsy and had some nausea, so he stayed in bed and took no insulin. At 1 p.m. he had a sudden attack of very severe generalized abdominal pain, which was especially severe round the umbilicus. The pain was very intense and quite continuous. At 4 p.m. the patient was seen in the casualty department. He was rolling in agony on the couch, clasp his knees and calling out for morphine. His temperature was 97.6°, pulse rate 136, and respiration rate 36. All his abdominal muscles were absolutely rigid, and the abdomen was if anything, retracted. Pressure made the pain worse, and it seemed to be aggravated on inspiration. The lower intercostal muscles on both sides were in spasm. The urine contained a fair amount of sugar (about 1 per cent.) and a large amount of acetone bodies, although the ferric chloride test was negative. The patient was not drowsy and had no signs of approaching coma. Both knee-jerks and ankle-jerks were absent.

DIFFERENTIAL DIAGNOSIS

Four possible diagnoses were suggested. First, severe and acute diaphragmatic pleurisy; secondly, a tabetic gastric crisis; thirdly, an acute abdominal catastrophe such as a perforated gastric ulcer; and, later, the rare condition of severe diabetic "colic." The character of the pain, the spasm of the intercostals, and the rather rapid respirations were in favour of pleurisy; but there was no cough, no friction was heard, and the temperature was subnormal. The absence of knee and ankle jerks and the severity of the pain naturally made one think of tabetic crisis, but there were no other signs of syphilis; the Wassermann was found later to be negative. Two alternatives remained—the true acute abdomen and the diabetic acute abdomen; the differential diagnosis between the two seemed impossible. There was no history of previous indigestion, and the patient was not in the least drowsy; in fact, there were no signs of approaching coma.

FURTHER HISTORY OF THE CASE

At 5 p.m. on Tuesday, March 17th, the patient was given 1/4 grain of morphine, and at 6.45 p.m. 60 units of insulin; it was decided to await further developments. At 7 p.m. the picture had completely changed. The patient was rapidly becoming collapsed, the pulse rate was 150, there was marked drowsiness and air-hunger. The eye tension was much lower, the tongue was raw and dry, the urine contained more acetone—a remarkably quick change in two hours. The abdomen was as before, and it was noticed that there was more tenderness on the right side than on the left. An enema was given with a fair result.

At 9.30 p.m. the blood sugar was found to be 0.644 per cent. At 10.30 p.m. it was 0.580 per cent. A leucocyte count at 10.30 p.m. showed 51,000 total leucocytes; 93.6 per cent. were polymorphonuclears, including many metamyelocytes; 6.4 per cent. were lymphocytes. The pulse rate was still 150, and the abdomen as before. It was then decided to operate if the pulse became any worse.

More insulin (60 units) and glucose (20 grams) were given at midnight, when the pulse rate was 130 and the patient a little more comfortable. At 6 a.m. the following morning the pulse was 118 and much stronger. The abdomen was still tender (although the pain had gone), and still a little rigid. A blood count at 10 a.m. showed 26,600 leucocytes, 91.2 per cent. of which were polymorphonuclears. The blood sugar was 0.184 per cent. and the patient was better in every way. The diagnosis of uncomplicated diabetic acute abdomen was then assured; the patient rapidly improved and was discharged fit three days later.

The subsequent behaviour of the blood cells is shown in the following table:

Date	Time	Red blood cells in millions	Haemoglobin. Per cent.	Total leucocytes	Polymorphonuclears. Per cent.
March 17th	10 p.m.	6.0	112	51,000	93.6*
" 18th	10 a.m.	6.3	112	26,000	91.2
" 18th	10 p.m.	6.1	120	18,400	87.6
" 19th	10 a.m.	5.9	120	10,800	79.6
" 20th	10 p.m.	6.3	122	9,000	71.6
May 14th	8 weeks later	5.7	124	9,000	81.0

* Including many metamyelocytes.

DISCUSSION

At one time the diagnosis and the advisability of operation were matters of extreme doubt. Even later, when the increasing ketosis and impending coma made the diabetic condition the probable cause, it was difficult to be sure that some acute surgical condition was not also present. Had we not known that a high leucocytosis may be present without any septic focus, the high count would have demanded immediate operation. The decision was made to operate if the pulse became worse, and if the diminution of the ketosis by the insulin did not relieve the pain and abolish the rigidity. Both pain and rigidity, however, rapidly diminished as the insulin took effect, and the man's general condition at once improved.

It should be stated that this clinical syndrome of intense abdominal pain, tenderness, and rigidity is very rare in severe ketosis and even in impending coma, although some sickness and moderate colic is common enough. We can make no serious suggestion as to the cause of the syndrome or of the accompanying leucocytosis.

SUMMARY

An extreme case of the acute abdominal condition occasionally associated with severe diabetic ketosis is reported. Intense abdominal pain, tenderness, and rigidity, and a high leucocytosis were present, simulating an acute abdominal condition. All the acute symptoms disappeared within twelve hours of adequate insulin treatment.

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ELECTRICAL TREATMENT OF NEURITIS AND WRITER'S CRAMP*

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The treatment of neuritis by electricity was advocated by the late Dr. Naunton Davies some thirty years ago. He published his results in the *Bristol Medico-Chirurgical Journal* in June, 1915, stating that the method was applicable only to interstitial neuritis in which there is hyperaemia and exudation in the nerve sheath. The diseased areas are limited in extent, the spots are often the size of a split pea, or smaller, the nerve between them being free from trouble. If a spot is overlooked, pain may remain in that spot, and radiate over a wide field.

* A paper read before the Cardiff Medical Society, April 14th, 1931.

DAVIES'S METHOD

The method adopted by Davies consisted, first, of testing for the affected spot; the negative pole of a faradic current is connected with a conical-shaped electrode covered with wash-leather, the positive being a large pad, which is connected to the arm or leg. Both electrodes are moistened with saline solution. The faradic current is so regulated that it will excite pain in the diseased spot, but will not cause pain in a healthy nerve. When the spot is touched with the electrode and pain is felt, the position is marked. The second stage is that of treatment, and for this purpose the galvanic current is employed. An insulated needle is connected with the negative pole, the large pad remaining positive. A local anaesthetic is next injected under the dermis, the needle is inserted, and the current is turned on; the needle is directed to the point where the pain is most acute. The current should not exceed 6 milliamperes; the needle is withdrawn after ten minutes.

A NEW TECHNIQUE

Having had an experience of nearly one hundred cases, I have modified the above technique slightly. The current used generally does not exceed 1 mA, frequently it is 0.2 mA. It is found that five minutes' duration is sufficient for the treatment; frequently after four minutes the patient states that the pain is diminishing. Two spots are often treated at one sitting. As to the apparatus, a pantostat may be used, but for some years I have used four dry cells, which can be carried in a portable case. The weak secondary circuit of an induction coil gives the faradic current. Frequently only two or three of the cells are used; more would cause unnecessary pain. The general results of the treatment show that where one or two spots occur on a particular nerve the action of the current gives immediate and permanent relief. If the faradic current is again applied to the spot after an interval of a few days, and no pain is felt, it is concluded that the spot is cured. Thus when a spot has been treated no second treatment is necessary. Occasionally when a spot is found there may be felt under the skin a small nodule; this disappears with the application of the galvanic current; the nodule may be a deposit of uric acid. On the other hand, when the number of spots is multiple, and when they are close together, the results are not so satisfactory and the relief is often only partial, or it may be some time before a moderate amount of success is obtained; this is assisted by the internal administration of iodine.

Neuritis occurs usually in superficial nerves, when those near a joint are affected, movement is limited, and the joint becomes more or less crippled. In rheumatoid arthritis the pain is sometimes due to neuritis surrounding the joint; the above method gives much relief. Neuritis of the forehead and scalp is often very painful, and does not easily respond to medicinal treatment. Frequently one spot alone is responsible for all the trouble; in such cases the treatment gives immediate relief. In the forehead, the nerve which is chiefly affected is the supratrochlear branch of the frontal nerve; this emerges from the orbit and supplies the lower and mesial part of the forehead. Of twenty-eight cases of neuritis of the forehead and scalp, this nerve was involved in twenty-three cases; in sixteen cases it was the only nerve affected.

ILLUSTRATIVE CASES

I now propose to give a few cases illustrating the treatment and the results.

In April, 1923, a man came to me and stated that he had had an attack of influenza five weeks previously, with acute pain in the forehead since then. I found two spots on the left supratrochlear nerve; these were treated, and complete relief

was afforded. In September, 1926, he returned, complaining of pain on the right side of the forehead. A spot on the corresponding nerve on that side was successfully treated.

In August, 1924, a lady was sent to me. She had suffered for two years from frequent and acute attacks of pain in the forehead. Often she was confined to bed for two or three days at a time; medicinal treatment afforded little relief. I found one spot on the left supratrochlear nerve, and treated it; the relief has been permanent. Her doctor informed me in September last that she had had no recurrence of pain since the treatment.

Neuritis is common in the region of the shoulder-joint and is occasionally mistaken for some kind of rheumatism. It limits movement of the joint, and may render the patient more or less unfit for his occupation. A frequent site of pain is over the deltoid muscle, the circumflex nerve being affected. Other sites of the lesions occur below the clavicle and over the scapula, occasionally also at the inner border of the latter bone.

A woman, aged 62, complained of pain for four years in the left shoulder, with inability to carry out many of her household duties. Two spots were found over the left deltoid, and were treated. Immediately afterwards she was able to raise her left hand to the top of her head, which she had been unable to do for four years. A few days afterwards another spot was found over the right deltoid; application of the faradic current to the old spots on the left side caused no pain. She was soon able to resume her household work without difficulty.

Neuritis of the deep nerves of the forearm appears to be one of the causes of writer's cramp. Three cases have come under my notice; two were slight, and easily responded to treatment. The most marked case was that of myself. For several years my handwriting had become steadily worse and very cramped; some wasting of the thenar muscles was present. I placed myself under the care of Dr. E. A. Goulden of Llandrindod Wells, who treated eleven points on the right forearm, seven on the anterior aspect and four on the posterior. Improvement was at first very slow; tincture of iodine was administered, and massage was applied. In a few weeks movement improved; later on, the whole trouble gradually cleared up and there has been no return of the disease.

Neuritic pain in the region of the hip is often associated with neuritis of the small sciatic nerve or its branches; frequently one or two spots are affected.

A woman, aged 54, who complained of pain in the region of the sciatic nerve, came to me in September, 1925. I found two spots, one on each of two branches of the small sciatic nerve; both were treated and the pain was relieved.

Another woman, aged 48, had suffered from sciatica for two years. I saw her in August, 1926, and found one spot on the small sciatic nerve on the left side, two spots on the similar nerve of the right side, and a spot on the iliohypogastric nerve. I heard from her in July, 1929, when she reported she was quite well.

Of thirteen cases of neuritis in the neighbourhood of the hip, in all but one the small sciatic nerve was affected. I have not treated a case where the great sciatic nerve was involved. Several cases have been treated in which pain is situated near the knee-joint.

In August, 1926, a woman was brought to me in a bath chair; her history was that for nine weeks she had been unable to do any household work, and had to be assisted in walking about the room. Examination showed a spot on the upper border of the right patella. This was treated, and in a few minutes she was able to walk more easily, and within a week was able to walk two miles. A spot on the right clavicle and another on the right deltoid muscle were also treated. She wrote to me in July, 1927, that she had remained well, and had had no return of her trouble.

The above cases show that the galvanic treatment of neuritis affords great hope for the relief of a disease which causes much pain and discomfort.