THE BOSTON MEDICAL AND SURGICAL JOURNAL.

VOL. XCVII.—THURSDAY, OCTOBER 25, 1877.—NO. 17.

INJURY RESULTING FROM ELECTRICAL TREATMENT.¹

BY D. F. LINCOLN, M. D.

I HAVE been led to select this topic by observing, oftener than I think could be due to mere coincidence, some evil effects from the application of electricity. I conceive that it is very important to warn practitioners of this possible danger, and to explain its source.

Electricity does not act alike upon all persons. In this it resembles many other nerve remedies, and even articles of diet, as spirit, tea, coffee, and tobacco, which in certain individuals produce apparently opposite effects from those regarded as normal. The closest and most intelligible analogon of this fact is found in the effect of a cold bath. Most persons are exhilarated; a few seem to be capable of bearing an indefinite amount, while others are chilled or prostrated for days by a single plunge. A sense of exhilaration is, in like manner, a very common attendant upon the electrical treatment; but some never feel it, others feel it irregularly, and others cannot bear the least amount without apparent injury. Another point in which bathing resembles the electrical treatment is the frequency with which sleep is produced. Sometimes a patient is hardly able to get out of the room for drowsiness; at other times the feeling comes on an hour or two later; it were greatly to be desired that this effect could be so managed as occur at the right time for sleep, but I am doubtful whether this can be accomplished with any certainty. The hypnotic action of electricity, however, is certainly of value.

It would be possible to explain all the actions of electricity by the simple word, "stimulation." I am not aware that there is any evidence that electricity acts like tea and alcohol, by arresting waste and supplying material for consumption. On the contrary, it seems to me, from clinical observation, that its action rather resembles that of alteratives which increase elimination, and that, like these, its use protracted beyond a certain point may rapidly run down the system. And this effect may be produced at the same time that each individual application gives a sense of relief or of increased vigor, which, though

¹ Read before the Boston Society for Medical Observation, October 1, 1877.

brief and soon replaced by lassitude, is so decided while it lasts as to tempt both physician and patient beyond the limits of prudence. It is this result that physicians should be warned against. There is, also, a temptation to try large doses where small ones do not succeed, and it must be confessed that respectable authority for such practices is not wanting.

Although there are few direct warnings in text-books, there is a rule laid down for practical guidance which amounts to the same thing. We are advised, in brief, to give but one or two dozen applications, and then to wait for a month or two in the expectation that the curative process, once commenced, may go on of itself in the interval. This may be a correct view to take, but I should like to add that the long pause may be simply a necessity in order to enable the constitution to recuperate its forces.

There is a popular notion that we merely pour in electricity as water is poured into a flower-pot, and the question is often asked whether the electricity remains permanently in the system, or how long it remains. To a scientific mind this is simply nonsense, but it is a view which is capable of doing harm if the physician imagines that his object is to fill his patients full of electricity.

A very large number of cases are *not* harmed, however, and I wish to illustrate this from the records of a former private dispensary for nervous diseases. Of one hundred and eighty cases treated there in succession many came but once, many were in no need of electricity, and many had a mixed treatment; but there were twenty-nine instances of decided benefit or cure through the use of electricity, and none of injury from its effects. As regards the diseases most often treated it will be instructive for us to go briefly through this list of cases benefited. I give them without classification:—

Shock to spinal cord from fall on occiput; debility, pain, and stiffness; cure.

Lead palsy, nearly cured.

Strain of aponeurosis and weakness, immediate great relief.

Rheumatism of biceps and trapezius, ditto.

Tremor of hand (aged fifty), direct relief to tremor and pain at each application.

Lead paralysis, improved.

Hemiplegia, hand decidedly improved.

Paresis of hand from confinement after a dislocation, decided immediate improvement.

Myalgia, came twice, reported "much better."

Myalgia, decided permanent relief.

Myalgia, twice faradized, with immediate improvement; a third time, said she was well, and very thankful.

Myalgia, faradized with temporary relief.

Torticollis, apparent temporary gain, but always relapsed.

Myalgia, faradized with immediate relief.

Muscular debility from disuse after a blow and pain, entire relief.

Asthenia and myalgia, greatly improved.

Paresis of the fracture, ditto.

Myalgia and irritable spine, much permanent relief.

Debility from onanism, immediate improvement in feelings, and apparent vigor for a day or two after each application.

Myalgia, immediate benefit.

Eczema, ditto, from one application.

Insomnia, dull and queer feelings in head from overwork at music, faradized once, felt better for a fortnight.

Myalgia and feebleness resulting from a strain, one application, decided relief.

Peripheral palsy, relief.

Cutaneous anæsthesia of fingers, patient says she is better each time.

Myalgia, three cases, relieved more or less.

To illustrate the injury sometimes done by electricity, I beg to present the outlines of five cases from my own practice, which are all that I can find distinctly recorded:—

CASE I. *Rheumatic Arthritis in a Lady aged Fifty-Five.*—There is a decided predisposition to this complaint in the patient's family; in her own case it has existed for a great many years, and has made considerable progress in the knuckles and knees.

The usual galvanic treatment directed to the painful spots, and also to the spinal cord, appeared on the second application to remove the pain directly, and to impart a sense of increased vigor of body, which was frequently experienced in subsequent applications. The treatment was applied two or three times a week for twenty times in all. But after perhaps the tenth time, I began to treat the knees locally, with occasional use of the application to the stomach and nape of neck as directed by Althaus. The former success, which had been extremely encouraging for two or three weeks, now became less marked. The pain, which had not been very severe, was violent, the knees became distended, hot, and red, and, in short, a regular attack or exacerbation of the disease occurred, which cut short the electrical treatment. Whether the electricity brought on the attack is not absolutely certain, but it appears to me that it may reasonably be thought to have done so; and in any case I should in future be cautious about continuing treatment if any signs of exacerbation appeared during the course of my operations.

CASE II. *Spinal Exhaustion in a Business Man of Thirty-Three, otherwise Healthy.*—There is no neurotic or rheumatic family history.

When young, the patient had headaches, but they have been better within a year. He has had no bad habits. He is not naturally very enduring, but has average strength. At the present time he has a good appetite; his appearance is that of a man of fine physique; his form is good, his muscles clean and handsome, reacting with unusual readiness to the faradic current, though he has never practiced gymnastics. The present debility has been coming on very gradually; he ascribes it to the close confinement and the mental annoyance which attended his business for nine years. He has now been out of business for ten months. He sleeps well, but wakes without a sense of refreshment. A slight exertion, such as talking for twenty minutes, is followed by a feeling of exhaustion. He can walk ten minutes, but this exercise, or driving, and, still more, riding, gives him a pain in the small of the back and higher up. He has no sexual desire at present; the sexual act used to exhaust him for days or weeks. Erections are frequent, nightly emissions rare. He has been taking phosphorus.

A moderate application of a descending galvanic current to the spine and (by stroking) to the inguinal region, was followed on the evening and night of the same day by considerable nervousness. The next day faradic treatment of the muscles was commenced and continued every other day for six times, when it became necessary to give oxide of zinc to relieve a restlessness and sleeplessness to which he never was subject until within ten days. There was no decided relief to the pain in the back.

Galvanization in the ascending direction, applied to the spine and sympathetic and scrobiculus cordis, was then practiced several times, when for some reason which I do not recall I tested his temperature. On two successive days it stood at $99\frac{1}{4}^{\circ}$ at three P. M., and at $99\frac{1}{2}^{\circ}$ at eight P. M.; next day 99° . Galvanism was suspended, and in a week his temperature stood at $97\frac{1}{2}^{\circ}$ and 98° . I do not know what to say to this phenomenon, but am clear that the patient grew to look somewhat worn and feeble at the close of the treatment, which was not severe. The nervous irritation and sleeplessness continued to trouble him as long as he received electrical treatment, and were not balanced by any good results whatever.

CASE III. *Muscular Rheumatism in a Man aged Thirty-Four, a Gardener.* — Exposure to wet while in the United States cavalry, from 1861 to 1865, caused occasional spasmodic pain in shoulders and neck; since then overwork as a gardener, and afterwards in an occupation requiring him to lift very heavy weights. Pain has always troubled him since the war; it is confined to the muscles, chiefly those of the left arm and right hip, next those of the left hip, left calf, and right arm. Confined to house six months at one time, and for most of the past three months. Great want of muscular power, and flabbiness and atten-

uation of muscular tissue. General health otherwise good. Galvanic currents were applied very thoroughly to the spine and the seats of pain and weakness; improvement was very rapid, and in less than two months he was entirely free from pain and able to go about and make light muscular exertion.

About the same time, however, he became the victim of severe dyspepsia, with pain in the stomach after eating, increase in the axillary temperature, and great prostration of strength. He moved to Maine, and there I learned that he recovered in a short time. The prostration, however, while it lasted, was a little alarming. I am disposed to believe that it was the effect of an over-stimulation of the nervous system by electricity. I have, I think, observed an identical effect in a less degree in a very robust patient with local muscular rheumatism, who was cured of the latter complaint at the expense of a general exhaustion of the system, which was relieved temporarily by cod-liver oil and iodide of iron, and permanently by a change of air.

CASE IV. *Locomotor Ataxia in a Lady aged Forty-Nine, with Weakness, Pain, Twitching, and Numbness in both Legs and Feet, and to some Extent in Arms and Hands.*—The pain was of the usual neuralgic sort. Paralysis of external rectus of left eye. Incoördination marked. She was treated by galvanizing the spinal cord and the legs for two months, and later for a month more. The applications seemed in many cases to give direct relief, followed by an aggravation of the symptoms. Thus the first application, galvanism in interrupted shocks to the loins and muscles of the thigh and leg, gave immediate relief to the weakness, which lasted a day, when the tingling and twitching returned so strongly that the method of application was changed to that of galvanization without interruptions. Again there was a decided sense of increased strength, and again the tingling returned. The relief was so considerable that she was very desirous to continue the treatment; but it is certain that she was worse at the end than when she began, and from the circumstances narrated I believe the electricity did harm.

CASE V. *Muscular Pain and Weakness of Legs, of a Chronic Nature, in a Gentleman of Thirty.*—From boyhood he was very easily fatigued in walking, and often suffered pain afterwards. This he neglected, and for some years past has been a good deal disabled as respects active exertion, although his physical appearance is very good. The muscles are firm, but not so large as they should be; reaction to faradic current very good indeed.

The patient had consulted Weir Mitchell, who considered the case "an example of local tire and fatigue pain, arising out of over-use and precisely analogous to the painful cases of writer's palsy." He advised "an hour a day of systematic massage, an upward galvanic current from coccyx to cervical region of spine, and a daily use of induced cur-

rents applied locally to the muscles" for two or three months at least, with as much rest as possible.

Unfortunately, the patient was living out of town, and was unwilling to think of removing to the city at the time. I applied electricity to the leg muscles three times, in moderate strength, at intervals of three days. Each time the effect was so far injurious that the muscular pain was decidedly increased *on the day after the application*, and the last time it was quite severe, lasting two or three days. In my judgment a case of fatigue pain should be treated by rest in bed, using massage and electricity to keep up muscular nutrition, as taught by Mitchell himself; and the continuance of the daily habits of sitting about and occasionally walking a little or riding to town was totally inconsistent with the use of electrical stimulus in the case of this patient.

In analyzing these cases it seems to me that a general exhaustion, or at least an exhaustion of the spinal forces, furnished the chief element of injury. To this statement an exception is furnished by the first case, in which an attack of local arthritis supervened during electrical treatment. There are other cases in which the expression "local irritation" furnishes a more intelligible explanation of the mischief.

I wish to add to these cases a brief mention of certain other undesirable effects, which were, however, transitory in their nature: —

A very hysterical patient, who was cured of hysterical paralysis by a long and patient continuance in treatment, once went into a slight fit in my presence while undergoing the spinal application of galvanism. This did not occur again; in fact the application as made on that occasion was altogether too harsh.

The group of symptoms which includes giddiness, faintness, nausea or vomiting, disturbance of the circulation or respiration, and excessive drowsiness is familiar to all electrical practitioners. It is commonly thought, and I have been in the habit of saying, that these effects are absolutely to be avoided if possible. And yet I have seen a man suffering from mental fatigue and insomnia relieved to a considerable extent for a fortnight after an application to his head of the induced current, which made him very giddy and sick for five or ten minutes. A patient who had aural disease, with tinnitus and epileptiform attacks of dizziness, received by accident at his first visit an over-dose of galvanism (by local application to the ear). He became giddy and faint, and was unable to work the next day; but on the day following he reported that his tinnitus was gone. Subsequent treatment was quite successful in relieving the latter trouble, and not only so but the attacks of giddiness, which had been frequent, are recorded as absent for a fortnight after that first visit. From such experiences I am led to doubt whether these symptoms are to be regarded as indications that a given application of the current is absolutely doing harm rather than good.

Another effect of too concentrated galvanic currents is the production of superficial eschars, rather slow in healing. It is well to say to those who have had little experience that these may be produced in a few minutes, without any warning pain, in certain patients whose cutaneous perceptions are weakened.

It is undeniable that neuralgic affections are occasionally made worse by electricity. This may sometimes be due to the influence of imagination; sometimes it results from injudicious treatment of nerves while in a state of active congestion; and I suppose it may be caused by a simple excess of electrical stimulation. The latter statement is doubtless true of the muscles.

Benedikt, who treats his subject with a remarkably free hand, uses the following words:—

“The electric current is *contraindicated* in cases where, in spite of all precaution, it is not borne well: for instance, in a few cases of tabes and hysteria, where it provokes violent symptoms of irritation; in cerebral affections when symptoms of congestion appear; in inflammations of the joints in the stage of active congestion, when, in spite of the mildness of the application, the congestion increases, and no immediate relief appears. *An increase of the bad symptoms ought on no account to occur during the electrical treatments.* If it does occur the intensity, etc., must be modified. The so-called ‘crises’ must be abandoned to other pathologists. If bad effects appear in spite of the modification, then the case is either wholly unsuited for treatment, or at least is so for the time being.”¹

“If a patient is insensitive we may usually employ strong currents; we are almost driven to do so by the necessity for satisfying the patient. It is necessary to be very careful about the brain, a region where we can never exceed a certain intensity without incurring a risk; and the same is true of the sympathetic, where it is easy to produce either paralytic symptoms, as unilateral heat in the face and head, and burning pain, or else deep disturbances of nutrition.”²

“A general rule respecting the intensity of the current is that *painful currents are not only unnecessary but as a rule harmful.*³ Almost the only exception to this is the case of hysterical paralysis with hyperæsthesia; in these cases either painful currents must be employed, or the treatment must be applied under chloroform. . . . General excitement, convulsions, spasmodic tension of the muscles, giddiness, pain, paralysis, cerebral hæmorrhage, bleeding into the lungs or rectum, and severe metrorrhagia are frequent consequences of too painful currents.”⁴

¹ Electrotherapie, 1874, page 132.

² Page 125.

³ I may remark that I have cured a supraorbital neuralgia by very painful faradic currents without any bad symptoms. — D. F. L.

⁴ Page 124.

"Loss of teeth and blindness (Duchenne) are also symptoms which may result from too powerful electrical irritation of the face and head. . . . All these symptoms are no phantoms of *doctrinaire* imagination, but facts drawn from experience."

The somewhat violent symptoms which Benedikt ascribes to the effects of painful currents are largely due (as the reader will observe) to the very great effect which such applications may have upon the vaso-motor system. All kinds of electrical applications, however, are capable of influencing with great power the vaso-motor and secretory functions, and are more or less valuable as therapeutic agents in affections of these functions.

In concluding these brief notices, let me remark that, as far as I am able to judge, the harm that may be done by electricity mostly arises from the effects of over-stimulation, that is, exhaustion of the spinal or ganglionic systems.

A CASE OF ADDISON'S DISEASE.¹

BY C. ELLERY STEDMAN, M. D.,

Physician, Boston City Hospital.

IN an article on this disease published in *The American Journal of the Medical Sciences* for January, 1877, Dr. William Pepper states that only ten cases of Addison's disease are quoted from American sources in Greenhow's tables. I therefore desire to put on record the only case I have met with, although the notes are not so full as could be wished. The family attendant, an eclectic physician, now dead, kindly furnished me with an account of the symptoms noted before death.

On the 8th of August, 1869, I was asked to make an autopsy of Ida S., aged seventeen years, who died the day before. Her mother says that the patient's menses have been regular since she was thirteen years old. Her complexion began to grow dark a year before; others of the family think this date is placed too far back, but Mrs. S. insists that twelve months have passed since the change was noted. The girl's general health began at that time to fail, but so insidiously that she was not considered ill till five months previously. Just before that time I saw her while attending her grandfather for a railroad accident which proved fatal, but only noticed that she was darker than the rest of the family, and was not asked for advice. Early in March she showed a dark circle around the neck, which was supposed to be caused by some article of dress, and the discoloration began to be observed by others beside her mother. Along with this she began to be puffy under the eyelids in the morning, was easily fatigued and rendered breathless, had frequent nausea and vomiting, headache, backache, and "sideache."

¹ Read to the Dorchester Medical Club.