Original Articles.

SOME GYNECOLOGICAL CASES TREATED BY THE FARADIC CURRENT.

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THE increased attention paid to the value of electricity in various departments of medical knowledge is a sufficient excuse for bringing the results of my experience to your knowledge to-night. The number of cases I have to report is not large, nor can the result in many of them be called striking. They may, however, serve to throw some light upon the limits within which we may expect this agent to do good.

In no branch of medicine has electricity made such rapid strides as a therapeutic agent, as in gynecology. Within a few years Mundé has published an article on "Electricity as a Therapeutical Agent in Gynecology," in the *American Journal of Obstetrics*, and Engelmann has read a most elaborate paper on this subject before the American Gynecological Society, published in the first volume of their Transactions.

Apostoli, whom Engelmann, possibly with an unconscious wit, calls the apostle of gynecological electro-therapeutics, has familiarized us with his, it may be, extreme views of the possibilities of this agent, and recent standard works on diseases of women, are not complete without a chapter devoted to its consideration.

The application of electricity is by no means a simple matter, and aside from the abstruseness of the subject, the expense of the apparatus, and the expenditure of time necessary to carry out the treatment have undoubtedly contributed to its neglect. The batteries themselves are expensive, and the instruments of precision necessary to an intelligent appreciation of what is being done, necessitate an even greater outlay. Most writers claim that the application must be a prolonged one, fifteen minutes to half an hour, though Engelmann has had most satisfactory results from much shorter sittings, from two to eight minutes, the average being perhaps five. These objections are valid when one is prepared to treat a large number of cases including tumors, in the elaborate and precise way recommended by the distinguished writers above mentioned, but it has seemed to me that good results, equal to and even better than those obtained by other well-known methods, may be attained by this agent applied simply and with inexpensive apparatus.

One of the questions to be solved before beginning treatment in the given case, is which current to employ, the galvanic or the faradic, nor are the instructions for their use clearly laid down in most writings on the subject. Engelmann says the galvanic current, which is constant, has a decided chemical action, hence it is valuable above all for destroying morbid tissue when strong currents are used, for promoting absorption of morbid structures and stimulating healthy nutrition when weaker currents are used. The negative pole is the most active chemically, possesses the highest destructive power, and tends to produce hæmorrhage; the positive pole is less painful, sedative with mild currents, and is decidedly hæmostatic.

The faradic current, which is interrupted, exerts a mechanical effect upon muscular tissue, and is used to

stimulate to contraction best with slow interruption of the current, while with very frequent interruptions it has a soothing effect. There is not apparently much difference in the therapeutic action of the different poles, though the negative pole is the more painful.

These are in general the principles upon which we apply the different currents, and though in the main the results have been satisfactory, yet longer and more careful observations are needed to enable us to decide which current is to be used, and how.

I have for some time been in the habit of applying the galvanic current in cases of nervous debility, where sleeplessness was a prominent symptom. A mild current given at bedtime along the spine for from ten to fifteen minutes, has given very good results. So, too, in cases of pain in the ovarian region, even though there were no pathological changes to be made out by vaginal examination, the galvanic current has given a certain amount of relief. For the past six months I have been using the faradic current in these cases, and as it seems to me with better success.

The battery which I have used has been the small battery of Gaiffe, which is probably familiar to you all. It is not a powerful battery, but I have almost never felt the necessity of a stronger current than this will furnish. Where the poles were to be used on the external skin I have used the metal electrodes, either covered with chamois skin or absorbent cotton. If one pole is to be applied to the vagina or uterus, an olive-shaped metallic tip on an insulated rod has been used. These tips come of different sizes, and can be either introduced into the uterine canal, or the larger sizes used in the vaginal cul-de-sacs. The usual duration of the applications has been ten minutes, rarely twelve or fifteen. I will give briefly the history of a few cases in which I have used the faradic current.

CASE I. Mrs. B., consulted me in August, 1887. She is thirty-six years old, has had one child, one miscarriage. Her principal complaints are; constant backache, bearing down, dysmenorrhœa and menorrhagia, the sickness lasting two to three weeks, and using from twenty-five to thirty napkins. Examination showed the uterus in normal position, but enlarged, the cavity measuring three and one-half inches. Diagnosis, areolar hyperplasia. Applications of tincture of iodine and later impure carbolic acid, were made at intervals to the uterine canal, and she was given fluid extract of hydrastic canadensis in the intermenstrual period, and ergot at the time. The dysmenorrhœa was relieved, and the amount of the flow lessened, so that in December she used only nine napkins. Since then the average has been twelve to fourteen. In December, a Chadwick pessary was introduced to relieve some of the pressure from the heavy womb. This helped the backache and bearing down, but the size of the uterus remained the same. April 2d, began faradization with one pole against the cervix, the other on the abdomen over the fundus uteri. This was applied twice a week for ten minutes. The second day following the treatment there was always increased pain, but on the whole the patient felt better. April 30th, the uterus measured two and three-quarters inches, and May 16th, two and one-half. During the first few treatments the patient distinctly felt the uterus contract rhythmically at intervals of perhaps a minute, such contractions being accompanied by pain.

¹ Read before the Boston Society for Medical Observation, June 4, 1888.

CASE II. Mrs. S., first consulted me in March, 1886. She was four months pregnant, and severe flowing had just come on. Miscarriage occurred that night, and the placenta, which was adherent, was removed with fingers, curette and placental forceps the next day. She gave the following history: Had been married eighteen years, had three children, and this was her fourth miscarriage. Menstruation, which had been scanty and at irregular intervals before marriage, had been gradually growing more profuse, until it now occurred every twenty-four days, and lasted a week. The flowing was profuse, accompanied with clots. On account of the menorrhagia, she had been curetted three times with but little effect on the amount of the flow. Suffers a great deal from backache, bearing down pain, especially before the sickness, constipation, pain in the left ovarian region. An examination after the patient had recovered from the miscarriage, showed subinvolution of the uterus and vagina, the uterus retroverted and flexed, the cavity measuring four inches, cystocele and rectocele, less from loss of the perineum than from the laxness of the vagina. The womb was restored to its normal position by systematic packing, and held in place by a soft rubber bulb pessary. The length of the pessary, five inches, gives an idea of the amount of the subinvolution present.

The pessary was worn a year with comfort, but there was little change in the size of the uterus. March 1, 1887, the operation on the posterior wall was performed. This was followed by a considerable amount of nervous prostration, from which the patient recovered slowly. Her local symptoms improved after the operation. Menstruation was less profuse, backache and bearing down had disappeared.

March 17, 1888, began faradization to the uterus. One pole was passed into the uterine canal as far as the fundus, the other placed on the abdomen. This method of application was found to be painful, and was followed by considerable soreness the next day; the olive-pointed electrode was, therefore, substituted, which was passed just within the external os. Applications were given every other day, except during the menstrual period, for two months. The uterus then measured on three different times two and three-fourths inches, three and one-half, and three inches. This variation seemed to me to depend upon the time of the month when the measurement was taken, as the larger depth, three and one-half inches, was found just before the menstruation. Two days after the flow it was three inches, about midway between the two periods it was only two and three-fourths. There has been a noticeable improvement in the patient's general condition and strength. The tone of the vagina has improved, so that a smaller pessary will soon be needed.

CASE III. Miss R., thirty-three years old, consulted me in February, 1888, with the following symptoms: For some months has been troubled with pain in both groins, especially the left; has constant backache; menstruation regular, but scanty, using from three to six napkins, and inclined to grow less from month to month. She has usually some dysmenorrhœa, and is also troubled with slight leucorrhœa. Has indigestion, soreness in pit of stomach, sour eructations, and constipation. Vaginal examination showed an enlarged, sensitive, and prolapsed left ovary, which was two or three times its normal size. There was also slight endocervicitis. The faradic current was applied from the left cul-de-sac of the vagina as near

the prolapsed ovary as possible to the abdomen, over the ovarian region, for five minutes, and for five minutes over the stomach and bowels. The treatment was begun February 24th and given every third day, and there was almost immediate improvement in the digestive symptoms. March 17th, after seven treatments, the prolapsed ovary could not be felt *per vaginam*, and the patient reported herself as feeling well, and discontinued treatment.

CASE IV. Mrs. H., thirty-two years old; one child fourteen years ago. Had a very severe laceration of the cervix and perineum, both of which were operated on: the cervix in 1885, and the perineum in 1887. In September of that year she came under treatment again for pain in her left side, situated two or three inches above the groin, very severe for two or three days before the catamenia, and relieved by the onset of the flow. When the flow stops for a day, which it is apt to do, the pain is excruciating. There is at times pain during the interval, and a constant feeling of soreness. Her general health has been very much improved since the two operations. Vaginal examination revealed nothing but a possible increased thickening of the left side.

The galvanic current was first tried, nine to twelve cells of the McIntosh battery. This application was followed by sleeplessness and depression. After several treatments these effects ceased, but there was rather an increase of pain for twenty-four hours, and when it did reappear it was more severe than before. Treatment was discontinued. March 2, 1888, faradization was begun, and applied twice a week for two months from the vagina to the abdomen part of the time, and part of the time from one side of the abdomen to the other. The relief to the pain was quite marked for two days following the application, and, on the whole, its severity was lessened. The pain at the last menstruation was not so severe.

CASE V. Mrs. G., twenty-five years old; married five years; no children. Was well until marriage; then menstruation began to be delayed, until it now occurs at a varying interval of from five to eight weeks. It lasts five days, and she flows rather profusely, using twenty-five or more napkins. She suffers considerable pain all over the abdomen the first twenty-four hours, so that she cannot bear the weight of the bed-clothes. She has, also, cramp-like pains and pain in the thighs. Suffers somewhat from leucorrhœa. Has constant backache and pain in both groins. A satisfactory examination being impossible on account of the sensitiveness and the thickness of the abdominal walls, ether was given. The examination showed an enlargement of both tubes and a general thickening of the tissues, in which the ovaries could be felt, but from which they could not be isolated. The uterus was normal.

The faradic current was first applied from each cul-de-sac to the abdomen, the only apparent effect of which was a diminution of the soreness of the abdomen. The menstruation in April, which occurred after a few applications, was, if anything, more painful, but the amount was less, only seventeen napkins being used. The constant pain in the back was now the most annoying symptom, so the method of application was changed. The positive pole was placed over the painful region of the back, and the negative over each ovarian region for five or six minutes, and as strong a current as could be borne was used. This was sometimes as much as the small battery would give.

The result was the entire relief of the backache for three days, and only a slight return on the fourth, and this, too, in spite of unusual fatigue. A vaginal examination at this time showed marked improvement in the condition of the left side, both as regards the amount of thickening and the sensitiveness. Very little change on the right.

CASE VI. Mrs. F. Married for fourteen years. One child thirteen years ago. One miscarriage. She has had a history of chronic invalidism dating from child-birth. Had her perineum operated on at the City Hospital four years ago, and following it had a pelvic abscess. Later her uterus, which was retroflexed and adherent, was partially replaced by packing at the Free Hospital for Women. When she consulted me in May, 1887, I found her uterus still retroflexed, and an extremely sensitive mass to the left. Her principal symptoms at that time were severe and constant pain in the left side and back, dysmenorrhœa and great weakness. Under prolonged treatment by packing, the uterus was got nearly forward, but was held a little to the right side. The left side was too sensitive to admit of a pessary being worn which would hold the uterus where it should be. January 16, 1888, applications of the faradic current were begun, and kept up for two months, twice a week, one pole in the left cul-de-sac, the other on the abdomen. The only effect was a slight diminution of pain for, at most, twenty-four hours after the application, and this result did not always follow.

In April she was examined under ether, and the mass was clearly made out to be an enlarged tube and ovary of the left side. In view of her long history of suffering, and the failure of ordinary methods of treatment, the removal of the diseased tube was advised, and she will enter the hospital in the fall for that purpose.

CASE VII. Mrs. T., thirty-six years old; a widow. Has had one child, fourteen years old, and one miscarriage. Two years ago had an operation for double laceration of the cervix performed. She consulted me again in November, 1887, on account of a profuse watery discharge from the vagina, beginning two days after menstruation, and lasting until four or five days before. This discharge is clear, odorless, non-irritating, and necessitates the use of a napkin. It is apt to occur in gushes, especially on change of position. She complains of pain in the right side. Menstruation lasts eight days, and is more profuse than formerly. Examination under ether showed the uterus enlarged to the size of two fists, more especially towards the right. The cavity measured four inches in depth, and nearly normal in direction. Right ovary normal; left ovary enlarged to size of hen's egg; not very hard. Diagnosis: Interstitial fibroid, enlarged left ovary.

Faradization was begun early in February of this year, and treatments were given every other day. The March sickness was very much less in amount, and the watery discharge during the inter-menstrual period was confined to a few days. The pain in the right side was diminished. The method of application was from the right cul-de-sac to the abdomen. Improvement continued in April. Treatment was then suspended, as the patient left town for the summer. There was no perceptible decrease in the size of the tumor. A letter dated May 13th, says: "I am now unwell, this time just on time, and very little for me. I am even better than usual."

CASE VIII. Mrs. P. was operated upon by Dr.

Baker at the Free Hospital for Women in 1882 for the removal of tubes and ovaries. She made a good recovery, and was able to go to work and earn her own living. In October, 1887, she was again admitted to the Hospital, complaining of pain in the abdomen. Under ether a small fluctuating cyst was made out to the left of the uterus, which was aspirated and several ounces of serous fluid drawn off. In December she returned with a history of pain and soreness in the abdomen to the left of and a little higher than the umbilicus. No cause could be detected for it on vaginal examination, and it was decided to be neuralgic in character, and faradization was recommended. This was applied from one side of the abdomen to the other, moving the poles about from place to place for ten minutes every other day for several weeks, with complete relief to the pain. The intervals were made longer and longer, and finally treatment was suspended as the pain did not return.

These few cases illustrate to some degree what classes of diseases may be expected to be benefited by the use of the faradic current. Inasmuch as its principal effect, especially with slow interruptions, is to stimulate muscular fibre to contraction, we should expect it would be of service where there was a lax atonic condition of the muscular structure of the uterus, such as we find in subinvolution. The first two cases were of this class, and the improvement in the size of the uterus after a short course of treatment was very marked.

The effect of the current with frequent interruptions is of a soothing character, and is shown by the relief to pain following its use. Four cases were characterized by pain, usually in the back and one or both groins, in all of which there was found evidence of disease of the appendages of one or both sides of the uterus. Case III, where one ovary was enlarged and prolapsed, but freely movable, improved the most in the shortest time. In less than a month the ovary could not be felt. Case IV, where there was an indefinite thickening of the left side, apparently the result of some old inflammatory process, the result was less satisfactory. In Case V, with both ovaries and tubes more or less glued together by inflammatory products, there was considerable relief to the pain and an improvement in the condition of the left side, as shown by the vaginal examination. Case VI, with a long list of chronic invalidism dating from the birth of her child, constant suffering, history of pelvic abscess, and where the examination showed a probable pyosalpinx, did not improve at all.

These different results in the different cases would lead us to expect good results from the faradic current where the tissue changes in the tubes and ovaries were slight, or where there was not much inflammation. Cases of simple prolapse, or of neuralgia of the ovary, would be most likely to respond to this form of treatment, and the result is probably due to a combination of both effects, that of stimulation to the muscular structure, perhaps, too, to the muscular coat of the arteries, thus helping the circulation, and of the soothing effect of the current with frequent interruptions.

Case VII, that of fibroid, though no diminution in the size of the tumor was apparent, improved markedly as regards the menorrhagia and the watery inter-menstrual discharge; I should, of course, expect more from the galvanic current in such a case.

Case VIII was one of pain, having its seat either in the abdominal walls or the coats of the intestines, and independent of the uterus. It was at times more an extreme soreness rather than a pain. Here the faradization did excellent service.

My cases are too few and my experience too limited to warrant any great expectations from this agent. It is not a panacea, nor does it work magical cures. I have, however, become convinced that cases of the character of those described in this paper have improved more rapidly than when treated by other methods. These are cases for which I would have applied tincture of iodine and glycerine dressings, and I think the faradization has worked decidedly better. The immediate effects of the treatment have been more favorable. Usually the application has been followed by a feeling of restfulness and quietude of the nervous system, which has lasted for several hours.

I am well aware of the imperfections in my method of applying it. The battery is simple, without any means of indicating or regulating the number of interruptions, and it has been necessarily empirical. I have so far failed to see any harm from its use, and my results have been sufficiently satisfactory to encourage me to make further trial of it.

VALVES IN THE VEINS OF THE HUMAN INTESTINES.¹

BY W. S. BRYANT, A.M., M.D.

HISTORY.

CHARLES ETIENNE described valves in the portal system of man, which he called apophyses, and which he compared to the valves of the heart. Bauer met valves in the short veins which run from the stomach to the splenic veins in man, which Cruveilhier was unable to verify.

Milne Edwards says that among mammals there are no valves in the portal system, but that in some species one meets in these vessels valves more or less numerous.

"Dr. Cresp, of England, has described valves in the splenic veins in some of the inferior animals. In one of the mesenteric veins of the reindeer he showed forty-two pairs of valves." (From the *N. Y. Med. Journal*, 1865.)

Hyrtl, in the *Lehrbuch der Anatomie*, says: "Only in the portal vein of the rodents have I found a very pretty spiral valve of three to eight revolutions."

Sappey has described some valves belonging to the portal system of veins. These were found in the falciform ligament of the liver in very small veins.

Dr. Hochstetter recently, in the *Archiv für Anatomie und Physiologie* (1887), from whose article I take the liberty to quote at some length, because his is the most complete work on the subject, notes the following observations, which I have been able to confirm for the most part. He found that in the newborn infant the venous branches upon the stomach were furnished with valves, one in each minor branch, very rarely two. These valves were bicuspid, and usually placed in those vessels at or near their open-

ings into the main branches. The branches of the coronary vein of the stomach oftentimes appeared to have a relatively small number of valves. In the great omentum the veins had valves at the venæ gastro-epiploicæ, and wherever smaller branches emptied into greater. "With increasing age, the valves become little by little incompetent: first, in the gastric branches of the venæ gastro-epiploica dextra near the pylorus, next along the great curvature in the branches of the venæ gastro-epiploica sinistra and in the venæ gastricae breves, so that they persist longest in the branches which empty into the communication (if there is any) between the two venæ gastro-epiploicæ. Towards the twentieth year of life no venous branches along the great curvature of the stomach seem any longer to possess competent valves. Comparatively late the valves of the superior branches of the coronary vein become incompetent, and, last of all, usually those in the veins of the great omentum, where I sometimes found, even in very old people, perfectly competent valves."

"The valves become incompetent with increasing years by becoming smaller little by little, so that the two opposite edges of the valves no longer touch when the vessel is completely filled. Finally, only two bow-shaped linear seams, corresponding to where the valves had been attached, remain, and these can disappear, so that no trace of the valves is left." Dr. Hochstetter goes on to state that in many animals valves are found in the gastric veins, and in some they are more numerous than in man.² In the horse, he found them throughout the gastro-splenic veins. He also found them in the main, as well as the small branches of the gastric veins in antelope dorkas, sheep, goat, and in carnivora (dog, fox, cat, and otter). They were most numerous and best developed in the dog and cat. He found valves also as well developed and as numerous in the horse and hog as in the beasts of prey. In the rabbit he found only a very few valves, and these were in the gastric veins; while in the hedge-hog and bat (*vesperugo noctula*) he found none. On a close examination of two monkeys, he found good evidence of valves in the smaller veins, especially towards the great omentum and here and there in the branches of the gastric tributaries of the venæ gastro-epiploicæ, or there were dilatations, indicating the former presence of valves. Dr. Hochstetter says it is not surprising that the valves in the branches of the portal vein become incompetent with age when we consider that many of the valves of the extremities do not last to maturity.

METHODS.

Professor Dwight has aided me with his able supervision in making the following observations:

Last winter, while making general injections of the abdominal veins in dogs, I noticed that the injecting mass rarely entered the small veins of the intestines, and, on close examination, found the obstruction was due to valves. I then made injections of the portal system in several animals and in the infant at birth, and lastly in adult man, with what results will be shown later.

The methods I used were calculated to show only competent valves. A coarse injecting mass that

¹ A Graduation Thesis. The investigations were made in the Anatomical Department of the Harvard Medical School in the winter of 1887-8.

² Henle had already mentioned valves in the branches of the portal vein of mammals. Weigle found them in ruminants and the horse. G. Leising, C. Müller, and F. Müller mention some valves in the splenic vein of the domestic animals.