

THE EFFECTS OF THE INDUCED CURRENT UPON PARTURITION.

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It is not an uncommon occurrence to meet with cases of confinements in which it seems likely that the child will be born in a few minutes, and yet there is a delay owing to the pains being very short, feeble, and at long intervals, although the mother shows no sign of fatigue. In these instances ergot might be of use, but it is not administered because it is expected that before it has time to act the labour would be over. Having met with three similar cases almost consecutively, I came to the conclusion that electricity might be of use, and I think that the results of my observations may interest some of the profession, as I am unable to find any mention of the induced current being used in parturition, except for the purpose of controlling post-partum hæmorrhage.

My first experiments were especially directed to discover whether the pregnant uterus, like the voluntary muscles, possesses *motor points*. After many trials, the conclusion I arrived at is that motor points exist, and can be easily found by bisecting the line drawn from the umbilicus to the middle of Poupart's ligament. This point is approximate, being only applicable before the uterus has descended, to allow the head of the child to enter the pelvis, and the spot varies slightly in each case according to the position of the uterus. When we talk of motor points, we must recollect that the uterine muscular fibres are of the unstriped variety, and that they do not respond to galvanic stimulation so quickly as the striped muscles.

When the poles of the coil are placed upon the spots just indicated the first thing observed is the immediate contraction of the abdominal muscles, the intensity of which depends upon the strength of the current. Occasionally, at the instant of contact uterine contractions commence, but more often a lapse of about a quarter of a minute is required, and not unfrequently they are delayed for two or three minutes. But still the current is taking effect, as the intermittent use, for instance, half a minute on and the same off, rarely fails to induce contractions in a few minutes; these increasing gradually in severity and duration while the intermissions become less and less. Latterly, however, I have applied the current only during the contraction, to obtain the benefit of the relief of pain. The following is a well-marked instance of galvanism producing uterine action:—

CASE 1.—Mrs. A—, aged twenty-nine. Third confinement, Oct. 1879. At 9.30 P.M. the os was very nearly dilated. The membranes were thick, and the child's head was in the first position. The pains were weak, and at intervals of rather more than ten minutes. The membranes were ruptured, and the terminals of the induction coil were placed one upon either side upon the motor points, and the current was only turned on during the pains. After she had three the pains became almost incessant, and they never ceased until the current was stopped. Although the contractions were violent she did not feel them so acutely as before the coil was applied. The child was soon born, and under the influence of the current the placenta was expelled forcibly outside the vulva. She had an excellent getting up, having very few after-pains.

The above case illustrates another frequent occurrence—namely, that *the pains do not cease until the current be discontinued*, but however more frequently, although the pains become very prolonged, yet they stop of their own accord. If it be wished merely to prolong any one uterine contraction, the current is best applied near the termination of the pain, when it will commence *de novo*. In one instance, which will be directly related in full, the induced current did not produce any uterine contractions, although the abdominal muscles did so violently.

CASE 2.—Mrs. B—, aged thirty. First confinement, June, 1879. Labour pains commenced yesterday soon after midnight. This afternoon at four o'clock the os was about the size of a crown piece, and very rigid. I administered an injection of hot water for six or seven minutes, during which time the pains were severe, and in ten minutes from the

commencement of the injection the os was fully dilated. Subsequently the head did not advance further than the lower part of the pelvis, and remained stationary although the pains were strong for three or four hours. About this time the pulse rose to 120 per minute in the intervals, and higher during the pains. I was then allowed to use the coil, and applied a gentle current to the abdomen, avoiding the motor points during the pains. The contractions of the uterus, which were previously every three or four minutes, increased in number to one about every thirty seconds. The most singular effect, however, was that the pulse rate during the interruption after the first pain, during which the current was used, declined to eighty per minute, and for twenty minutes the pulse did not rise above that number. Besides *during* the second pain the pulse fell to sixty beats per minute; subsequently the pulse did not vary either during or between the pains. After twenty minutes it rose to a hundred, and as I came to the conclusion that mechanical interference was necessary, I applied the forceps and delivered her. Another striking effect was that before the current was used the woman was very fatigued and worn out, and every pain tried her much, but immediately upon the application of the galvanism the careworn expression vanished, and the subsequent pains were not so trying, although she still felt them, but not so severely. Mother and child went on well.

CASE 3.—Mrs. C—, third confinement, July, 1879. Soon after midnight, when I saw her for the first time, the os was half dilated. Cranial presentation, first position. The pains had commenced at about 3 o'clock on the previous afternoon, and there was about five minutes interval between them. At 4 A.M. I was called again, the os was nearly dilated. The pains had become very slight, and soon disappeared entirely. Pulse 140. She looked worn out, and complained of faintness, which was the reason I was called. As there was no obstruction I gave a dose of ergot, and applied the coil. Neither had the slightest effect of producing uterine contractions, although the abdominal muscles responded freely. In less than half a minute the pulse rate was lowered to 108, and all the sense of fatigue disappeared. As all the bad symptoms were arrested, I gave her a sedative. Eighteen hours afterwards the pains commenced again spontaneously, and the child was born at 10.40. The placenta was, as in previous labours, entirely adherent. She had a good getting up.

The first consideration we will take will be that of the sensation of pain. In Case 1 this was almost entirely removed by the current, while in Case 2 it was lessened, and in other instances not quoted it continued more or less severe. As we find that the induced current has such a variable effect upon the pain during labour, we think it is impossible to ascribe the whole of it to the sensation caused by uterine contraction, and we think there is another factor usually present which partakes of the character of neuralgia. This conclusion is founded partly upon the fact that the pain is not in proportion to the intensity of the uterine contractions even during the same labour, and partly that when the pain is disproportionately severe, there usually accompanies it other more or less distressing symptoms, such as nausea and vomiting, or the peculiar sinking feeling at the pit of the stomach; and besides, we find that pain is excessive more commonly in weakly women whom we should expect to suffer from neuralgia, rather than in those of a phlegmatic temperament. Of course allowance has to be made for the circumstance that one woman will bear with fortitude the pain which will demoralise another, also for the mechanical difficulties attending the dilatation of the maternal soft parts, and for the relative sizes of the child and mother. If this division be made, it is not more difficult to understand that the induced current will remove the neuralgia attending labour than that it will frequently do the same in other cases, while in no instance in which, when present, was the sinking feeling entirely removed, and I have not as yet met with a single instance of vomiting after the current was applied, although in several it was previously incessant.

As regards the influence of the current upon the pain produced by the second factor—namely, the uterine contraction—it may be stated, in short, that it is slightly diminished. One of the best methods of testing this question is by observing that when the contractions are intensified and prolonged under the influence of faradism, the woman does not complain of their being more painful; and in one instance I was even begged to discontinue the current because "the pains were no good," although the

pressure upon the child, as perceived by vaginal examination, was much more considerable than when the current was omitted.

Very nearly allied to the subject of pain is the constitutional effect of galvanism upon the woman. In Cases 2 and 3 the current was not used until the patient was prostrated, and her pulse rapid. In the former case not only did the fatigue disappear, and the pulse become slower, but the pains were absolutely intensified; while in the latter the prostration was removed, but no uterine contractions could be produced. These are the only two instances I have met with, because the patients in the other confinements allowed the coil to be applied before prostration became manifest.

Faradism has a very striking effect upon the pulse rate during parturition, having a tendency to equalise it. If the rate be normal, the pulse is slightly quickened both during its use and also during the intermissions. But should the rate be much too rapid, it is lowered, and usually approaches the same number per minute as that to which in the former instance it rises. Taking an average, the number of the pulse beats per minute under the influence of the current is about 90; and this does not alter, as a rule, during or between the pains. It may be mentioned here that the after-pains do not seem to be in any way affected when the current has been used in labour, nor has anything gone wrong in any one case subsequently.

From what has already been stated, it is comparatively easy to say beforehand what patients are the most likely ones to be affected favourably by the induced current—viz., (1) those of a nervous temperament, who are easily excited, and who usually feel pain acutely; (2) those who have sympathetic disturbances, such as vomiting and hiccough; (3) those who require stimulation.

In my opinion, the best way of applying the current is to place the electrodes (each being about three inches in diameter) upon the abdomen over the motor points, these being retained in their proper places by the binder. It is very easy to make flat electrodes of spongio-piline by running through the waterproof covering several wires in different directions. Large electrodes are preferable to small ones, because the same current spread over a large surface is not felt so acutely as when it is concentrated into a small space. For the relief of pain a very mild current is only required, but for the production of uterine contractions a variable strength is necessary.

P.S.—Since writing the above I have used the induced current in forty-one cases. In all there was a diminution of pain, which was well marked in most. With one exception the uterine contractions were increased. In the exceptional case ergot likewise failed, and forceps were necessary on account of uterine inertia. Two women had sickness; one of whom suffered from bronchitis, and retching was induced by her cough. In the rest vomiting and nausea, when present, were almost instantly relieved. In every case the mother and child did well. The after-pains were in no way altered. In one case the current was applied for the relief of false pains ten days previous to her confinement, but was ineffectual.

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