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INTRA-UTERINE INJECTIONS IN POST-PARTUM HÆMORRHAGE.¹

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POST-PARTUM hæmorrhage, with its sudden emergencies and its instant demand for energetic treatment, is a subject of great importance to every general practitioner, and particularly so in connection with the question of treatment by means of intra-uterine injections, a practice which is becoming quite common, but the merits of which are still *sub judice*. Of the efficacy of intra-uterine irritant astringent injections there is no doubt; it is the danger attaching to the practice which I shall allude to especially. It is a generally conceded fact that injections into the uterus, in any condition of that organ, are dangerous. Penetration of the fluid through the Fallopian tubes, even when every precaution has been taken by experienced operators to insure the return of the injection through the dilated cervix, has been the cause of so many evil results that Dr. Barnes says, "I rarely employ them now except in urgent danger from menorrhagia." Dr. J. Whitehead² states that "it is evident that fluid injected within the uterine cavity, *without force* and in small quantity, may mount by ciliary action through the Fallopian tubes into the peritoneal cavity with great quickness." Dr. Simpson, in his *Diseases of Women*, says, "Never think or dream of throwing liquids into the interior of the uterus by means of any injecting apparatus, for severe and fatal inflammations are very likely to ensue. Such a result may perhaps be caused by the fluid running along one or other patent Fallopian tube, and escaping into the peritoneum; more probably it may be due to laceration of the mucous membrane and entrance of the fluid into one of the uterine veins." Dr. T. G. Thomas (*Diseases of Women*) says "there can be little doubt" that this accident may occur, and he alludes to a fatal case mentioned by Von Haselberg, where, after an injection of an iron solution, "the metal iron was detected by chemical tests in one tube." If the danger of injections penetrating the tubes be so manifest in the non-gravid uterus,

¹ Read before the Massachusetts Medical Society and recommended for publication in the JOURNAL.

² *British Medical Journal*, 1873.

it is obviously greater in the relaxed post-partum uterus, when, if the syringe be carried directly to the fundus, as Dr. Barnes directs, and the injection is made slowly, the speedy exit of the fluid, which safety demands, is interfered with by the horizontal position of the woman and the blocking up of the uterine cavity by clots. The *British Medical Examiner*, March 15, 1874, contains a report of a case which is conclusive evidence of the risk of penetrating the tubes. In this instance injection of a solution of perchloride of iron was followed by death in thirty hours, the autopsy revealing an ink-black clot in the right Fallopian tube and adjacent peritoneal surface, with unmistakable signs of inflammation. Even a vaginal injection may cause a like disastrous result, as is shown by a case which Dr. T. More Madden reported in 1875, where metro-peritonitis occurred eighteen days after delivery, and was caused, evidently, by the astringent injection finding its way into the uterus and through the Fallopian tubes into the peritoneum. The absorption of fluids by the lymphatics with which the mucous membrane of the uterus is supplied, and their conveyance by the abdominal lymphatic chain to the peritoneum, is also a recognized source of danger. The experiments of Klemm upon the cadaver showed that sometimes blue ink injected into the uterus with only moderate force found its way into the venous system and broad ligaments without any apparent laceration of surface. It is the possibility of such accidents that leads Playfair to say, "The evidence is overwhelming that intra-uterine injections, however carefully practiced and however small in amount, are apt to be followed by very alarming if not dangerous symptoms." This, said of injections into the non-puerperal uterus, applies with still greater force to the uterus after delivery.

Alarming and fatal results from the entrance of air into the circulation have sometimes followed uterine injections. The sinuses in the relaxed uterus, standing open like the veins in bone, and, if Dr. Barnes's supposition is correct, possessing, by their nearly emptied condition consequent upon severe hæmorrhage, "a certain suction action," afford dangerous possibility of the passage of air to the heart through the valveless pelvic veins and the vena cava.

Dr. Barnes relates a case in which death occurred "suddenly, soon after the injection, with symptoms resembling those consequent upon air entering the circulation." Dr. Olshausen reported a case (1864) in which a vaginal douche of water was used to expedite a lingering labor; after eight minutes' use the patient began to complain of oppression, and in a minute, at most, was dead. The autopsy showed air bubbles in the uterine sinuses, the right broad ligament, the vena cava ascendens, which was enormously distended, and in the right cardiac ventricle. It was concluded in this case that the tube of the syringe had entered the uterine cavity, that the force of the injection

had separated the placenta, and that air taken up with the water had been driven into the uterine veins. Schroeder, in his work on Midwifery, says, "It is unmistakably shown that death may take place when by means of an injection apparatus air is forced with the water into the uterus under a certain pressure;" and where injections are used in parturient or lying-in women, he emphasizes the necessity of *every bubble* of air being previously removed from the syringe, a warning somewhat difficult to heed at the time of one of those frightful hæmorrhages which demoralize patient and friends, when, as frequently happens, the physician may have no competent assistant, and the woman is in the dangerously restless condition that often accompanies flooding.

Stimulated by Dr. Barnes's example and teachings, there has arisen among many eminent obstetricians an enthusiastic advocacy of the use of injections of the per-salts of iron in post-partum hæmorrhage, which have been used so frequently that we are compelled to one of two conclusions: either that there has been an alarming increase of emergencies demanding such heroic treatment, or that the injections have sometimes been used unnecessarily. That the use of iron injections is attended with special risk is evident from the statement of Dr. Ringland before the Dublin Obstetrical Society, that out of forty-five cases of post-partum hæmorrhage treated by the perchloride of iron, eleven terminated fatally, an undeniably large proportion of deaths from this cause. In a recent discussion before the Obstetrical Society of Edinburgh, Dr. Matthews Duncan affirmed that, "unfortunately for the boastings, women had died from post-partum hæmorrhage apparently more than ever, and even when the vaunted remedies of perchloride of iron and transfusion — both declared to be inestimable and sovereign — had been employed with skill."

One of the risks which must always attend the introduction of the salts of iron into the uterine cavity after delivery is that the coagulating effect may not be limited by the uterine walls, but may extend to the venous circulation, with possible death from embolism. Sudden death has followed injections of solution of iron into *nævi*, accounted for by post-mortem evidence of coagulated blood in the vessels and heart; is it more strange that the iron can reach the heart by way of the valveless uterine and pelvic veins and the vena cava? Dr. Barnes does not consider the two conditions analogous, but they are at least very similar: the iron is introduced into the circulation, though in both cases it is intended that there shall be a local coagulation only. Playfair's explanation of the action of the iron, "We now have abandoned contraction as a hæmostatic, and are trusting to thrombosis," implies, although it does not verbally recognize, the danger of embolism. Death has occasionally followed suddenly from this cause. Dr. Cederskiöld re-

ported to the Swedish Medical Society a case where the patient died before the injection (one to seven ferri perchl.) was completed. The autopsy showed dark-brown blood clots in all the vessels from the uterus to the heart, as well as in the peritoneal cavity. Moreover, in this case, the vessels were filled with air bubbles, making an instructive example of the danger of penetration of the tubes, entrance of air into the circulation, and chemical destruction of the character of the blood in the venous system. An instance of the danger attending the use of iron solutions in the surgery of the uterus is given by Dr. Spencer Wells, in the London *Medical Times*, 1862: "Serious cardiac and pulmonary symptoms, with the almost instantaneous appearance of a rash like erysipelas or scarlatina all over the body, followed the application of tincture of perchloride of iron to a cauliflower excrescence of the uterus; in this case clots of various sizes were found in almost every vessel examined after death." In the London *Lancet*, 1867, Dr. Playfair reports three cases in which symptoms of pulmonary embolism appeared after labor, the patients all recovering. In two of these cases there was post-partum hæmorrhage, in one of which iron was injected. In his remarks upon these cases he says, "In two of the three there was post-partum hæmorrhage, and a tendency therefore to coagulation from the altered condition of the blood," which condition he considers to depend upon excess of fibrine favoring spontaneous thrombosis; he makes no mention, however, of the iron injection as a probable cause of the embolism, which is somewhat singular when he explicitly states that its efficacy consists in its plugging the sinuses with thrombi. Had he called attention to this fact in his remarks upon the three cases of embolism, it would have rendered still more forcible his conclusion that "the main element in the treatment of such cases is the most rigid rest."

An accident liable to follow iron injections, and one that will serve more than anything else to deter physicians from using this treatment, is the occurrence of septicæmia. Dr. Sims recently stated that in his opinion the advocates of the practice in London are beginning to be afraid of the injections for this reason. The septicæmic symptoms are the result of the retention and decomposition *in utero* of the hard clots formed by the blood and the solution of iron. Dr. Emmet writes, "Under no consideration would I inject persulphate of iron into a cavity to arrest hæmorrhage. It possesses in itself no styptic properties, and only coagulates a mass of blood, which then acts mechanically. The blood is so destroyed in character by contact with the persulphate that it undergoes decomposition within a few hours. From this source the patient frequently becomes blood poisoned before any septic element has been generated elsewhere." Dr. Thomas considers the danger of septicæmia from this source as "very grave." Dr. Lusk lost a patient

from this cause, concerning which he writes me that it has warned him never to use a remedy to coagulate the blood directly in such cases. The cases reported by Dr. Snow Beck prove to any but prejudiced observers that the septicæmia which caused the death of the patients was due to the effects of the solution of iron. Reports of fatalities asserted to be due to iron injections have been set aside as not proved by enthusiastic advocates of the practice, who have affirmed that septicæmia, metro-peritonitis, pyæmia, etc., are just as likely to follow post-partum hæmorrhage treated by what are called "ordinary means." Were this true it must be considered bad practice not to use the iron injection upon the immediate occurrence of hæmorrhage, before excessive loss of blood shall of itself predispose to subsequent inflammation and blood poisoning. The postponement of this treatment until other means have been tried in vain is a tacit confession that the risks alluded to *are* increased by the effects of the iron. Dr. Barker mentions first, among the causes of septicæmia, the decomposition and absorption of uterine clots, and with regard to peritonitis he says, "It has long been settled by the best pathologists that peritonitis is rarely a spontaneous and primitive disease. It is generally associated with some inflammation either of the uterus, the ovaries, the Fallopian tubes, or the broad ligaments." It is manifest that inflammation of these parts is less liable to occur spontaneously than as a consequence of the hard, irritating clots formed by the iron. In any condition of the uterus a dangerous application, the dangers attending its use are greatly increased by postponing it until the contractile power of the uterus is lost and all the conditions for introduction of the iron into the veins or through the Fallopian tubes into the peritoneal cavity, with possible septicæmia as a result, are in greatest force. Even those authorities who sanction the use of iron injections advise subsequent measures to reduce to a minimum the possibility of danger from decomposition of uterine clots. On the same page in his work on Midwifery, Dr. Playfair reassures skeptics by asserting that no one has yet brought forward any cases in which the evil effects of injections of perchloride of iron have been conclusively proved, but a little lower down he refers to a case of his own, in which septicæmia followed the use of an injection; upon consideration of which case he advises the use of antiseptic injections to prevent the decomposition of the retained clots. Dr. Chadwick writes that it is his "belief that many of the fatal results observed after injections of iron might be prevented by subsequent disinfecting injections." To prevent infection the antiseptic must be used within a few hours after the iron injection, must be frequently repeated, and, with however much care applied, may fail to reach the thrombi which Dr. Playfair supposes to fill the sinuses, in which event complete disinfection is not secured. Theoretically the use of subsequent antiseptic

tic injections might be rendered needless by combining with the solution of iron a proportion of salicylic acid, which Bartholow asserts to have "the power to prevent fermentations and putrefactive decomposition," and which, also, judging from the sharp temporary irritation I have seen to follow its application to the cervix uteri, might increase the excito-motor action of the injection. That iron injections almost invariably and immediately check post-partum hæmorrhage is undeniable, but it is by no means proved that their styptic or coagulating property, upon which their value as hæmostatics has been asserted principally to depend, is the most important factor in their action. Dr. Barnes states that the blood is instantly seized and coagulated at the mouths of the vessels, and also that the inner surface of the uterus is constricted by the action of the iron, this constriction being a further aid in closing the vessels. I think that the constricting action alone, supposing contraction does not follow the injection, is the essential factor in checking the flow, and that coagulation alone could not accomplish that result unless the solution penetrate the sinuses deeply. The effort to stop a bleeding in other parts of the body—for example, from a tooth socket—is sometimes unavailing, even though the undiluted tincture is used and the cavity plugged; the sinuses, kept open by uterine relaxation, offer an analogous condition, and it is unreasonable to suppose that a solution of iron, of which nine tenths are water, if Dr. Barnes's directions are followed, can check by mere coagulation a profuse post-partum hæmorrhage. If this view be correct, the coagulating property is an unnecessary element of danger, and simply a disadvantage which should be overcome by substituting for the iron an agent of equal astringent power, one that does not coagulate the blood and that is equally effective in exciting uterine contraction, which is the only safe hæmostatic. Many obstetricians claim these advantages for iodine. Its use as a remedy for post-partum hæmorrhage was first advocated by M. Dupeirris, of Havana, in the *American Medico-Chirurgical Magazine*, 1857, who, Playfair states in his work on Midwifery, has reported twenty-four cases in which he applied it with immediately successful result and no subsequent ill effects. Dr. Emmet states that he has used Churchill's tincture of iodine to maintain uterine contraction after the removal of fibroids for more than ten years, and its action is certain to arrest bleeding unless there exist some impediment to the proper contraction of the uterus; he also considers it a most valuable antiseptic. He writes me that for years past he has advised the use of hot-water injections and Churchill's iodine in post-partum hæmorrhage, and that both have been used in New York at his suggestion. Dr. Barker writes that he has used iodine twice with satisfactory results; Dr. Peaslee, that he prefers iodine to iron, "as being quite as efficacious and not so objectionable; the after-effects of iron are often bad, those of

iodine not so, as far as I know." Dr. T. G. Harrison reports a case of hæmorrhage successfully treated by injecting two drachms of Churchill's iodine. At a meeting of the American Medical Association, 1876, Dr. Larrabee, of Kentucky, reported that iodine was much used in Louisville in such cases. Dr. Wilson, of Pennsylvania, in a case of irrepressible hæmorrhage that continued several days after delivery, had at last resorted to tincture of iodine. The uterus, although only three or four drops were injected, at once contracted and remained so. In a valuable paper entitled *Injections of Tincture of Iodine into the Cavity of the Uterus after Delivery*, read in 1874 before the New York Medical Society, Dr. J. D. Trask makes the following statements: "As an excito-motor agent iodine is probably at least equally good [as iron], while incapable of causing the formation of dangerous thrombi in the uterine vessels. . . . The application of iodine to the lining membrane of the uterus is probably of all things the surest means of counteracting a tendency to absorption of septic matter after delivery. Since adopting the practice of injecting iodine after operations upon the interior of the uterus, Dr. Emmet has not encountered a single case of septicæmia." Dr. Trask disavows the position of claiming positively for iodine a superiority over iron, as he thinks that in extremely rare instances it *may* be impossible to excite uterine contraction, in which cases the iron is theoretically more powerful; but my investigation does not show me any cases in which the iodine failed to induce contraction. That iodine is a direct excitor of muscular action is shown by its effect upon the non-gravid uterus. In the *Lancet* for January 6, 1866, Dr. Murray states that "the muscular contraction that follows this injection is remarkable, the tube carrying the iodine being tightly grasped so that its reintroduction at the time is extremely difficult." Drs. Barker, Emmet, Wilson, and Harrison have used the undiluted tincture, a practice much more likely to be followed by immediate contraction than either diluted iodine or iron. Incapable of causing the formation of thrombi, and therefore not demanding the use of subsequent disinfecting injections, requiring but a small quantity if used in full strength, hence reducing the danger of penetrating the tubes and sinuses, we should be justified in using iodine much earlier than iron, thus preventing absolute loss of contractile power and being saved the necessity of resorting to a remedy of *possibly* greater power and *certainly* greater danger.

Of injections of cold water I will only say that, though widely recommended, they are not to be depended on if postponed until great exhaustion occur; if not followed by immediate contraction the prolonged use, by lowering vitality, does much harm. Of hot-water injections Dr. Emmet asserts that "very hot water is a prompt excitor of uterine action." Dr. Windelband¹ states that he has used injections of

¹ British Medical Journal, 1875.

water at about 100° F. in twenty-one cases of abortion, in cases of severe hæmorrhage from placenta prævia, in post-partum hæmorrhage, etc., and he is convinced that the hot water exerts a far more energetic action on the muscular structure of the uterus than cold water either alone or with astringent remedies in solution, and he has never found any disadvantageous results.

Injections of matico, vinegar, lemon juice, and other astringent and irritating substances have been brought into notice as invaluable in treating post-partum hæmorrhage, but certain strictures apply to all: entrance of air into the circulation, penetration of the tubes and sinuses, with possible systemic blood poisoning as results, attach to each. Because the use of intra-uterine injections in post-partum hæmorrhage, especially of those containing iron, is becoming common, I have deemed it not inopportune, by setting forth the views of prominent obstetricians, to call attention to the dangers of the practice rather than the advantages, for heroic measures sanctioned and lauded by high authorities are sometimes blindly resorted to by physicians of more limited experience. That such injections are sometimes the only hope of safety in post-partum hæmorrhage may not be gainsaid, but it should also be kept in mind that dependence upon such remedies causes too ready resort to them and, more than that, the neglect of the most important part of the treatment, *prevention*. Dr. Trask says, very justly, in alluding to the statement which Dr. Hicks made with regard to having employed the iron injections "a great number of times," "No matter how extensive a man's practice may be, he can scarcely have met with a great number of cases in which the conditions are those which Dr. Barnes prescribes," namely, absolute loss of contractile power. That cases of alarming flooding are not checked before the necessity arises for styptic injections is sometimes the physician's fault, for it is his duty, not the patient's, to see that the means for meeting such an emergency are always within reach. His obstetric bag should contain not only his forceps and his favorite styptic, but also ergotine, brandy, ammonia, morphia, ether, hypodermic syringe, and hand-atomizer. If none of these are needed for ninety-nine cases out of one hundred, in the hundredth case the trouble of carrying them will be amply repaid by having them at hand when needed, and the physician may be spared the unsatisfactory reminiscence of a case of flooding which resulted fatally because the remedy which was sent for arrived too late. I have mentioned ether and an atomizer as necessary adjuvants because several cases have been reported (one by Dr. Hicks and another in the *Medical Record*, April 7, 1877) in which ether spray applied to the hypogastrium was followed by immediate uterine contraction. This method of exciting reflex action possesses obvious advantages over the application of ice. From a consideration of the fact that in Dr. Wilson's case it was nec-

essary to inject a very few drops only of tincture of iodine, we may conclude that the same effect would follow the same remedy applied upon a sponge or swab, thus substituting a safe for a dangerous method. The solution of iron may be employed in the same way or in a solid form, as has been done by Dr. Ringland, with results as immediately successful as those attending iron injections. Of this method Dr. J. More Madden writes me, "I have also, in a few instances, employed the solid perchloride of iron with very satisfactory results, but whether this was altogether due to the styptic I much doubt, as probably the introduction of the hand containing the salts into the uterine cavity had no small share in exciting the uterine contraction by which the hæmorrhage was arrested," certainly a strong argument against the hasty use of intra-uterine injections.

Women who have suffered from hæmorrhage in previous confinements, those who are delivered by forceps, especially when under the influence of an anæsthetic, those who suffer from tedious labor dependent upon any debilitating cause, and those whose labors are exceptionally rapid, with very short intervals between the pains, are especially liable to post-partum hæmorrhage; in all these cases anticipating measures are of great importance, and as it is never superfluous to reiterate useful directions, I will conclude by calling attention to several important points: In a case in which hæmorrhage occurs it is well to rupture the membranes as soon as the os is fully dilated, as Dr. McClintock recommended; to inject subcutaneously a dose of ergotine as soon as the head presses upon the perinæum (ergot by the stomach is not so sure to act, and is useless if the hæmorrhage occur immediately upon the birth of the child); always, and above all, to follow down the fundus with a firm hand which shall not be removed, unless it can be replaced by an equally trustworthy one, until firm contraction has existed for at least half an hour after complete delivery. I believe that in very many cases the binder is used too early, and that however scientifically applied it cannot exert compression as completely as does the hand. It cannot prevent uterine relaxation, and its early application over an imperfectly contracted uterus merely gives the physician a feeling of security which has no better foundation than that which the ostrich is supposed to have when it thrusts its head under the sand to escape danger; he *hopes* he is all right, but he lacks common sense. The emphatic direction of Dr. Meigs, in lecturing on post-partum hæmorrhage, was, "Turn out the clots." If this were done thoroughly upon the immediate occurrence of flooding, and at the same time ether spray applied to the abdomen, the emergencies demanding irritant uterine injections would be exceedingly rare.