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ORIGINAL ARTICLES.

THE RÔLE OF BACTERIA IN PARTURITION.¹

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About six years ago, in the Boston Gynecological Society, upon the subject of antiseptics in midwifery, I advocated that an instrumental labor should be conducted with all the antiseptic care and precaution of a major surgical operation. Then, I found myself without support; now, I do not expect all to accept such a proposition. If the subject was by any means settled, or such principles adopted, your attention would not be called to its discussion. Few topics in the entire realm of medicine hold to-day a deeper or more wide-spread interest, for which we are indebted in America, in no small degree, to the valuable paper by Dr. Thomas last year before the New York Academy of Medicine, and the reply of his equally distinguished opponent, Dr. Fordyce Barker, followed by a number of other contributors of scarcely less note holding various views. The pendulum of thought is never still. Upon certain phases of this subject it has appeared to have swung to the opposite, until now, in Harvard and other schools, it is taught that antiseptic injections should be used in all cases of normal labor as a routine practice.

Dr. Z. B. Adams, of Framingham, in a vigorous paper² read in Boston this past winter, takes strong ground against the routine use of the vaginal douche in normal labor. He claims that under such conditions the douche is not only useless, but harmful and injurious. Dr. Adams cited several cases in which serious results, death even had supervened. Five or six fatal cases were reported in the experience of the members present, where it appeared probable that the result was due to the use of the douche. The discussion was earnest and long-continued, with evidence of wide difference of opinion. It should not be difficult, abstractly, to state the problem which in this way at least is one of extreme simplicity. If we accept that the fact of parturition normally as a physiological process, that the uterus is a closed aseptic cavity before delivery, one danger to be apprehended lies in the introduction, after delivery has been effected, of a new abnormal or pathological element, into the recently emptied organ.

¹Read in the Section on Obstetrics and Gynecology at the Thirty-Sixth Annual Meeting of the American Medical Association.

²Boston Medical and Surgical Journal, Feb 19, 1885.

This new factor, according to our recent knowledge and belief, is due to the development of a bacterial ferment. Many erroneous doctrines are still taught in regard to the processes of reproduction, especially of the placental development.

There can be little doubt that the catamenial decidua is the product which is elaborated by the uterine glands. This is equally true of the uterine decidua (*decidua vera*) of pregnancy. The numerous openings or holes which give the appearance of a sieve to the decidua, only indicate the points corresponding to the orifices of the utricular glands in the cavity of the uterus, which remain fully open to allow the constant passage of the product of secretion. In the early period of pregnancy this secretion is doubtless furnished for the nutrition of the fœtus; later this is elaborated by the complex glandular organ of new formation which we call placenta. The serotinal cells are elaborated from the sub-mucous layer of connective tissue, and, when separated, as a more or less perfectly formed placenta, there takes place an extensive traumatic lesion of the uterus on account of the laceration of the parts, which leaves bare the uterine tissue which had been covered by the placenta. The muscular contraction and rapid shrinkage of the organ reduce the size and cavity, and at the same time aid in hastening the proliferation and expulsion of the broken down and necrosed material.

Physiologically, this must be an aseptic process. If the pathological factor lies in the ferment or bacterial poisoning, how may this be introduced? Certainly from without. If excluded from the air or any foreign body the uterus, even to its cervical portion, may be likened in its injuries to a sub-cutaneous wound. When not undergoing change from fermentation the lochial secretion remains a non-irritant innocuous fluid, although swimming with broken down and even necrosed cellular debris. From this standpoint of view we must take exception to the position assumed by Dr. Thomas, above referred to, as well as many others, both in Europe and America.

Dr. Thomas states "that the lochia is in every case the offensive fluid, that it is made up of dead and decaying animal tissue." True, it contains dead, cast-off tissue, and is always a highly albuminous fluid, just the material for the feeding, in their rapid growth, of micro-organisms, when accidentally introduced into this then most efficient incubating chamber. Normally, they certainly are not present; and when absent decay or ferment cannot occur.

Whence come the micro-organisms, the ferment necessary as seed? Is it auto-genetic, normally found in the parturient canal? If so, why does not every woman suffer in confinement from septicæmia?

Is it likely that of all organic functions, that upon which the continuance of the species depends and which is common to all animal life should, as Dr. Adams pertinently remarks, be the one which acts only under conditions tending to decay and death; that is to say, under conditions of disease? Micro-organisms are usually found in the vagina in health. Would this give us the seed for the sowing of the direful harvest? Evidently such belief pertains to most who have advocated, as preventive, vaginal injections both before and after the completion of labor. This appears to be the weak point in Dr. Thomas's position, and the almost only effective argument used by Dr. Barker against him in reply.

The history of the ages shows that the mortality of normal labor of the entire animal kingdom is very small. No one emphasizes the fact more clearly than Dr. Thomas that in all primal labors, at least, there are as a rule solutions of continuity usually both cervical, vaginal and perineal. In the normal labor the outflow for a few days is constant in current, the drainage of the vaginal canal is usually excellent, and yet this albuminous material, as found upon the napkin or external parts, is generally of a decided odor, and, when carefully examined microscopically, is found swimming with bacteria-termo, these most useful of nature's scavengers, the omnipresent agents for taking to pieces and refitting for other uses albuminoid compounds. In this form of micro-organism we surely rarely have danger, and when we consider the normal conditions present we readily see why we do not find these growths in the uterine cavity. Although I am as earnest an advocate for cleanliness as any other, this fact will explain why, amid filthy surroundings, the unwashed, unchanged, uncared-for woman so very generally makes a good convalescence. In a theoretical way it is possible for us to consider that the bacteria-termo of decomposition serve a useful end, by utilizing and exhausting the material otherwise efficient to feed an army of most dangerous enemies.

Dr. Thomas advises a careful disinfection, closing and sealing of all perineal and vaginal rents. Most excellent advice, and surgically very important, which we hope to see generally adopted; but, when we remember that he advocates this with the distinct object of lessening the danger, or obviating the cause of puerperal fever, we can but think he becomes unintentionally misleading, and in so far fails of his purpose, for we cannot believe that Dr. Thomas would teach that septic absorption from the injuries of the ostium vaginae is the cause of puerperal fever. At the most, these are open wounds of tissues of comparatively little importance, and would certainly endanger the patient in a degree no greater than after operations for perineal restoration, and we do not suppose our distinguished friend would consider a general dangerous septic poisoning at all likely to supervene upon perineal repair.

The above argument would not hold good in lacer-

ation of the cervix, since this is the part of an organ which has undergone a most marked physiological change. The vascularization of the uterus and pelvis at term is extraordinary; the lymphatic system has become equally developed until the physiological state is one nearly akin to certain well-recognized pathological conditions. However, it is not shown that puerperal fever is especially liable in primal labors, and yet it is generally accepted by all that cervical lacerations are far more frequent, in a certain degree rarely absent, in first confinements.

It would seem that even here something more is wanting than the initial lesions under ordinary conditions to induce the dreaded dangers incident to so-called puerperal fever. Careful cleanliness before and at labor should be enjoined, a strong antiseptic vaginal douche before delivery may be wisely advised. The circumfusa of the patient is by Dr. Thomas taken into account. A specially prepared room, with every surgical precaution, an aseptic atmosphere is emphasized and enjoined, even to wiping the furniture with carbolic or bichloric solutions. This is certainly safe, and of no very great consideration so far as expense or trouble is concerned. It is a consideration, however, unless really demanded, if we may not cause thereby serious foreboding and unnecessary nervous trepidation on the part of the patient. This would certainly not be required if the delivery was normal, and normal labor is accepted as an aseptic condition equivalent to a subcutaneous surgical operation.

Let us suppose the labor no longer remains normal, but that manipulative interference becomes necessary. Here the entire phase of the question is changed; and under these conditions I would emphasize the use of the most thorough antiseptic surgical precautions. Our proceedings are now subject, in large measure, to atmospheric exposure, and here we need an aseptic atmosphere. In home, as well as hospital, let its purification be enforced. I have for years in instrumental labors believed in and used the spray. It certainly can do no harm, it may be of the greatest value. Infinitely more important, however, is the aseptic state of the operator. If the physician has been attendant upon infectious diseases, he should take a bath, change his entire clothing, pay particular attention to his hair and beard, and scrub his hands and especially under the nails with 1-20 carbolic solution, or 1-1000 mercury bichloride. The same care must be used with instruments. In all cases where the placenta has been detached manually, let the uterine cavity be antiseptically treated, ergot given and the uterus kept in control until firmly contracted. Then iodoform may be wisely introduced into the vagina, and a compress applied externally, moistened by a reliable antiseptic solution.

Why are these precautions dogmatically asserted as arbitrary rules? Without especial review, simply because they are based upon the same general principles which govern in surgery. Then are puerperal poisonings and surgical poisonings essentially the same? Of this there can be little doubt. As I have insisted above, the bacteria of decomposition have nothing in probability of casual relation thereto. It

is the round cell growth, the micrococcus, which is active here as in the septicæmia of wounds. The bacteria of decomposition do not readily reproduce in the blood of animals, and when injected therein rarely do more than serve as a more or less active chemical irritant. This is not true of the micrococcus. Under favorable conditions, which are so very general in the pregnant state, they effect lodgment, colonize with a rapidity entirely inconceivable. Such seed introduced into such a favorable soil must yield an abundant harvest.

The planting ground, however, is rarely the vagina, but is found in the uterine cavity. It is hard to conceive of an incubating chamber presenting more favorable conditions. The albuminous fluid furnishing abundant food, the heat point steadily maintained, open sinuses, lacerated vessels, denuded walls through which ramify an abundant network of lymphatic vessels, all furnish conditions for generation and absorption rarely equalled. Carried along with the lymphatic stream, they are distributed to neighboring and often distant organs. They not seldom form thrombi in the veins, and as such are carried into the circulation.

The micrococcal development is all the more dangerous, since it is accompanied by no marked odor, and I fear many have been and are accustomed to determine conditions by such imperfect and unsatisfactory methods. When once infected have we means within our power for remedying the evil? Here again the conditions are much the same as in surgical septicæmia. Washing out the uterus does not prevent the mischief already done to the neighboring tissues. Dr. Lusk most tersely and forcibly puts it as follows: "The douche, however, is not infallible. In cases where there has been inoculation of the round bacteria, they often invade the tissues beyond the original lesion, and it is of small avail to wash out the uterus when the victorious army has advanced far away from the point of attack. Washing the arm daily after vaccination does not prevent the development of vaccinia. Washing out the uterus after the pelvic tissues are infiltrated with septic microspores may cut off the reinforcements, but does not prevent the progress of puerperal septicæmia. I would advise, therefore, not to continue the uterine douche in cases where the results of the first thorough injection furnish the evidence of its importance."

In my own experience I have treated the uterine cavity as I would an infected, suppurating, sloughy wound. I do not hesitate carefully to remove with blunt curette any irregular placental masses from the uterine cavity, and in a number of instances have applied thoroughly the liquified crystals of carbolic acid. This, I believe, may be safely used, since the acid coagulates the albuminoids and is thereby not readily absorbed, while it acts as a local stimulant to the surrounding tissues and makes them less absorbent. I have also often introduced a considerable quantity, fifteen to thirty grains of iodoform, within the uterine cavity and allowed it to remain.

The relation of erysipelas to puerperal fever has long been suspected, and was first advocated as cause in Boston. An unfortunate series of cases occurring in the practice of a brother physician, within the year, is

worthy of notice. Following a case of erysipelas early in January, there supervened in his practice five fatal cases of puerperal fever, the last developed at about the tenth day, erysipelas following what seemed a slight abrasion in the middle line over the coccyx up the back, and then diffusing laterally, until it became general, and before death had extended over quite the larger portion of the body. I inoculated sterilized bulbs at the bed-side with fluid taken with much care directly from within the cervical cavity. Micrococci in a pure culture were reproduced in rapid growths, and in appearance they could not be differentiated from the micrococci in the cultures from the blisters of erysipelas.

Too much importance has undoubtedly been placed upon the use of injections. We think Dr. Adams and others have shown that they are in normal labor at least of doubtful benefit, and are not seldom dangerous. The douches doubtless often carry the very infection for the destruction of which they are employed. Who of us have not seen the use of dirty unboiled water with serene composure, because, forsooth, a little of some doubtful antiseptic had been added thereto? Danger lies even in the hand of experts of world-wide fame. Under date of November 14, 1884, Dr. H. G. Bigelow writes me from Berlin that Schröder has lost three cases from intra-uterine injection; in the last case 1-1000 mercury bichloride was used. Dr. Adams pertinently remarks that one set of authorities advocate the use of one kind of syringe, and another, laying blame to the instrument instead of the method.

We have already attempted to show that in normal labor it is not required, while it is too plainly apparent that after the disease has developed and micrococcal poisoning has supervened the intra-uterine douche too often fails to secure the desired result. Earlier I believed differently, and gave much thought to the perfecting of a double soft rubber injection tube for this very purpose. Experience in Europe as well as in America, clearly teaches the great importance of the subject, and the salvation of lives in large numbers has undoubtedly followed the more or less general wise precautionary measures adopted.

Under date of March 25th, 1885, Dr. E. W. Cushing writes me from Berlin, "The acceptance of the germ theory is universal, and its application is most incredible in thoroughness. The habit of washing out the vagina after child-birth, in cases which give no evidence of infection, has been entirely given up in the well regulated German hospitals as unnecessary where proper care and cleanliness prevails, the washing both inside and outside being done with the utmost thoroughness *before*, not after parturition."

A better general understanding of the subject will aid in carrying on the good work "I will show you my faith by my works," saith the apostle of old. One must understand the great underlying principles of antiseptic surgery, and accept them *in belief* in order to carry them wisely into effect. Let the facts be adduced and the reasons clearly shown for the innovations demanded, else they will be relegated to the systems and fashions of the fallacies in the medical art.