GONORRHEAL PUERPERAL FEVER.*

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It has long been observed that a latent gonorrheal process will, in the months following parturition, assume fresh virulence, spread to regions that had hitherto been free from its ravages and cause symptoms of a most serious character. Just at what time this extension occurs, or in what manner it is brought about, has thus far, however, not been sufficiently explained. Above all, has the profession at large failed to recognize the fact that puerperal wounds may be inoculated with the gonorrheal virus during delivery or within the first two weeks *post partum* and that such infection may give rise to symptoms, which, but for the bacteriologic findings and subsequent course, closely resemble streptococcic puerperal fever. The bare fact of such occurrence is, to be sure, mentioned in most of our text-books on obstetrics, but the subject here is not given the consideration it deserves. The frequency of its occurrence, above all, is greatly underestimated. When we consider the number of pregnant women who are infected with gonorrhea —quite frequently infection and conception occur at the same time— we must indeed wonder that the process does not cause trouble oftener than is the case. The percentage of gonorrhea in pregnant women varies, in the statistics of Buckhardt, Oppenheimer, v. Steinbuchel and Sänger, from 18.1 per cent. to 27.7 per cent. Of this large number fortunately only a small proportion show an extension of the process in the puerperium. Bumm holds the gonococcus responsible in 7 per cent. of his 166 cases of puerperal infection; and others, such as Koenig, find even a considerably larger proportion (28 per cent.) due to this micro-organism. The subject is one, therefore, not deserving the neglect it has so far received at our hands.

In American literature I was able to find only the reports of Cumston and Rosenberg upon this question. I have therefore felt justified in publishing the following five cases in full. The patients were all treated at the Female Hospital and I am indebted to the Superintendent of that institution, Dr. N. J. Hawley, for permission to report them:

Case No. 1.—M. V., nineteen years of age, domestic, entered the

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hospital January 27, 1899. She had no previous labors and had no leucorrheal discharge. On May 15th, was delivered of a healthy child. In delivering the placenta the membranes were caught in the cervical canal, and with difficulty extracted by the finger of the accoucheur. On the seventh day *post partum,* the patient's temperature rose to 102° with severe colicky pains in the abdomen. The following day the temperature had risen to 103° and the lochia were observed to be profuse, somewhat offensive, glairy and yellowish, and contained gonococci in large numbers. The patient was curetted and a few shreds of membranes and blood clots removed. The temperature fell to normal two days after curettement, but in the next two weeks it occasionally rose to 100.6°. She left the hospital on June 15th, one month after delivery, and at that time still showed considerable yellowish discharge from the uterus but no more pain or temperature. The uterus had never been much enlarged and the adnexa were still apparently free from inflammation. One year later the patient returned with double-sided tubal swellings. Gonococci were found in the cervical secretion. A double salpingectomy was performed.

Case No. 2.—M. H., colored, aged twenty years, house-girl, entered hospital April 24, 1899. She had never before been pregnant and gave no history of a previous leucorrhea. On May 28th she was delivered of a full term child. The perineum was lacerated to the second degree. On the sixth day, *post partum,* the temperature rose to 100.6° and stayed between 99.5° and 100.5° for three days. The lochial discharge was yellowish and profuse, with some slight odor. On the eleventh day the temperature rose to 102° and the following afternoon to 105°; pulse 120. There was considerable pain and tenderness in the lower abdomen. Curettement on the same day brought away a few small shreds of membrane, and a good deal of glairy, yellowish pus from the uterus. Gonococci were found in the lochia. On the thirteenth day the temperature had fallen to 100° and on the fourteenth to normal. The discharge continued profuse and the temperature again rose to 101.6°. An intra-uterine douche was given, but this was followed by renewed attacks of pain, a chill and fever. Antistreptococcic serum (10 c.c.) was injected four times without beneficial result. The temperature continued between 101° and 102°. On June 27th, one month after childbirth, patient was still in bed, suffering pain. Unguentum Credé was applied twice daily, in teaspoonful doses with good results. The patient did not leave the hospital until August 2, at which time uterus and adnexa were found to be normal.

Case No. 3.—N. T., nineteen years, servant, entered hospital June

26, 1899. She had no serious illness in her life and had never before been pregnant except the previous summer, when after three months' gestation, she had had a miscarriage. This, however, left no untoward results. She had no leucorrhea on entering, but said that three months ago she had had a profuse yellowish discharge with burning urination. This discharge she attributes to infection from her husband, who had had a similar discharge the week previous. Of late the discharge and painful micturition had rapidly diminished. She was eight months pregnant. The night that she entered the hospital labor pains began. Delivery was uneventful except for an adherent placenta, which had to be manually removed. The puerperium was normal until the fourth day, when a temperature of 100.4° was noted. The lochia were not at all offensive but quite profuse and rather yellowish in color. Bichloride (1-4000) vaginal douches were repeatedly given in the next two days without effect on the discharge. On the eighth day the temperature suddenly rose to 103° with slight chilly sensations and severe pains in the lower abdomen. Microscopic examination of the pad showed gonococci in large numbers. That evening the uterus was curetted but no shreds of placenta or membranes were found, only large quantities of a yellowish pus which showed an absolutely pure culture of typical intracellular gonococci. After curettement there was a gradual fall of temperature to 99° on the following day. The uterus, though comparatively small, had been very sensitive to pressure and remained so for several days afterwards. On July 13th, eight days after curettement, patient was taken from hospital by friends in spite of advice to the contrary. At that time there was still some discharge from the vagina containing gonococci but no more pain or fever. The uterus was no longer painful and the adnexa were not swollen.

Case No. 4.—L. C., eighteen years, house-girl, entered hospital January 15, 1900. No previous pregnancies. Last menstruation on July 1, 1899. Has had some leucorrhea. Pains began on March 30th, and delivery was in every way normal. On the fourth day, *post partum,* temperature rose to 100.2°; patient, however, felt perfectly well. On the sixth day, temperature 101.2°, pulse 88, lochia profuse, yellowish and glairy; slight pain on pressure over the uterus. On the seventh day, morning, temperature 100.6°, pulse 88; afternoon, temperature 103.2°, pulse 100. There were now colicky pains in the lower abdomen and sensitiveness on pressure over the uterus. The latter was not enlarged, reaching only about one inch above the symphysis. The vaginal discharge showed gonococci in large numbers. An intrauterine douche (1-6000 bichloride) was given and the pus washed out

from the uterus showed gonococci in pure culture. On the eighth day, the temperature had fallen to 101° and on the ninth day to normal. It remained between 98.6° and 98.8° during the following week, throughout which time the patient received frequent vaginal douches. On April 16th, when the case left the hospital, vaginal examination showed the uterus of normal size, not tender, no swelling of either adnexa, slight vaginal discharge.

Case 5.—A. H., eighteen years, colored, house-girl, entered hospital June 1, 1900. She had never previously been pregnant and had missed menses for seven months. Acuminate warts were found about the vulva and vagina in large clusters. Patient had a yellowish discharge from the vagina and a urethritis, the secretion from which showed gonococci. June 3d, the child was prematurely born. In the course of the delivery (breech presentation) the hand was introduced part way into the uterine cavity in the effort to keep the head well flexed. The placenta came away entire. During the first week after delivery there was only a slight elevation of temperature, the highest being 101°. Lochia profuse. On the morning of the seventh day, the patient had a chill followed by a fever of 103.6°, pulse 108, severe colicky pains in lower abdomen. The temperature remained over 102° throughout that day and the pains continued. The discharge had a disagreeable odor but was not offensive. In character it was glairy, profuse and yellowish. Gonococci were found in large numbers. Orders were given for three vaginal douches daily, and stupes when in pain. On the eighth day the temperature was still 103°, pulse 110, but fell to 101° during the next three days with slight abatement of pains. On the twelfth day the pains again became severe and continued thus for ten days with the fever ranging from 101° to 102.5° and the pulse at about 105. Vaginal examination at the time, difficult owing to great tenderness and some tympanites, revealed uterus large and fixed, some resistance in both tubal regions. Several intra-uterine douches of hot sterile water were given, bringing away considerable quantities of yellowish pus but no placental tissue. In spite of protest the patient was taken home on the twenty-second day. She returned three and a half months later with symptoms of pelvic inflammatory troubles. The condylomata acuminati about the genitals had become even more numerous than before. Internal examination showed the right tube thickened and painful, profuse yellowish discharge from the uterus.

During the period in which the above-described five cases of gonorrheal puerperal fever occurred, there were confined at the hospital 343 women. This would make the percentage of such infection in all cases

1.4 per cent. Besides the cases reported, there occurred during this time 24 cases of puerperal infection, due to other micro-organisms; most of these were of a mild nature, only one, due to the streptococcus pyogenes, running a fatal course. This would make the gonococcus the etiological factor in 17 per cent. of all cases of endometritis *in puerperio*, which figure is about midway between those of Bumm and Krönig.

It is claimed by Olshausen and Baumm that these cases of gonorrheal infection are not properly to be classed as puerperal fever, since they involve merely an extension of a process already existing in the patient. Yet, surely, these authors would not hesitate to apply the term, "puerperal fever" to a streptococcus infection of the uterus, following erysipelas in the same patient, in which a similar extension of a previous infection takes place. There is some justification, to be sure, in denying the term to endometritis occurring three to four weeks *post partum;* but, these I do not wish to include in my consideration of gonorrheal puerperal fever. A number of cases develop symptoms within the first 14 days, and here we undoubtedly have an infection of the puerperal wounds themselves.

These gonorrheal cases have served, to a certain extent, to clear up the mystery of autogenous infection. Granted an endocervicitis gonorrhoica, and, without an internal examination during labor or afterwards, merely by the rapid proliferation in the puerperium of the germs present, an entrance may be effected into the uterine cavity causing a general infection of that organ.

In general the puerperal infection by the gonococcus is, however, due to some procedure in labor whereby the finger, hand or instruments of the accoucheur has entered the uterine cavity and thus of necessity carried upward the germs lying in the cervical canal. It will be noted that in three of the five cases in my list, there is record of intra-uterine manipulation during labor.

The puerperal state has long been known as an excellent breeding place for bacteria, and the gonococcus is no exception to the rule. Once having gained an entry into the uterine cavity, it multiplies at a prodigious rate. The increased lumen of the uterine end of the tube facilitates its entrance into this organ and thence it may rapidly ascend to the peritoneum. In this way, tubal, ovarian or pelvic abscesses, due to gonococci, have developed within two weeks after childbirth. In accord with this rapid development the lochial discharge at this time will be found to contain almost a pure culture of gonococci. Whereas, during pregnancy, but few gonococci, if any, can be found in the cer-

vical secretion of infected cases, the lochia beginning from the second to the fifth day *post partum*, or, are loaded with them and, as Bumm expresses it, the individual cocci are unusually "large and fat." I was particularly impressed with this increase in size in my examinations. Apparently the growth of the gonococcus inhibits the development of other bacteria in the lochial discharge, for even where specimens were not obtained directly from the uterus, but were taken from the vulvar pads, very few other bacteria outside of gonococci were to be seen.

So recent has been the recognition of this form of puerperal fever and so few have done careful work upon this subject that we still remain without a well-defined clinical picture of the disease. It is for this reason that I have presented this part of my subject in some detail.

For the first five days after delivery there is usually no disturbance of any kind, on the part of the mother. Calmann occasionally observed a slight rise in temperature to 100.5° on the third or fourth day. This was also noted in all of my five cases. There is usually a corresponding slight increase in the pulse-rate, but on the whole, the patient feels perfectly well, unless it be for some sensitiveness about the cornua of the uterus. As a rule, however, the puerperium seems to run a perfectly normal course for the first six days. The lochial discharge is the first thing to call the physician's attention to some abnormal process in the uterus. By the sixth day it has become very profuse and has a peculiar, rather disagreeable odor, differing from the foul smell of retained placental tissue and also from the stale odor of normal lochia. In my own observations, I was particularly struck with another feature of the discharge,—the large amount of mucus present,—giving it a glairy appearance and tenacious character. Its color is usually more yellow than normal. Characteristic, too, is its unusually irritating and biting nature, often giving rise to considerable soreness about the wounds of the external genitals and occasionally even causing an intertrigo.

At the end of the first week, or the beginning of the second, we have the first general evidence of an infection. There are usually rigors or even in some cases, a distinct chill followed by fever. Within 24 hours the temperature has risen to 103° to 104°; the pulse increasing to 100 to 110 per minute, but full and regular. There is often headache, aches in the limbs, general malaise, rarely nausea or vomiting. On being called to the patient, we usually find her suffering from intense colicky pains in the lower abdomen. There is considerable tympanites and extreme sensitiveness over the entire abdomen. The fever will usually remain constantly high for about two to three days without the irregu-

lar rise and fall that is so typical of streptococcic infection. Then it will gradually subside to normal.

The pulse which has always been comparatively infrequent, returns to normal. The tongue is moist. The patient eats heartily and sleeps well. The abdomen is soft, but in the region of the uterus and tubes there is still considerable tenderness and in some cases the swollen tubes can be palpated through the abdomen.

Such is the typical course of a severe attack. Naturally, many a case runs a more benignant course and is then often overlooked. There may be fever for but a single day and not over 101°. This is particularly true of the cases in which the first symptoms occur later, about the twelfth to fourteenth day. Here the patient has usually already risen from the bed and the immediate symptoms may be so mild as to permit of the patient's being up and around. It is held by Bumm, Sänger and Strassmann that *only the late mild form is due to the gonococcus alone; that all cases in which a high fever occurs within the first eight days, are due to mixed infection.* This view is opposed to the findings of Krönig and Calmann. Of Cumston's five cases, two show a high fever as early as the fifth day. Particularly instructive in this connection are *Cases 3 and 4 of my series, in which upon the seventh and eighth days respectively, a temperature of 103° was recorded. Here the secretion was obtained directly from the uterine cavity under aseptic conditions, and the fact that the careful examination of several specimens showed the presence of gonococci in pure culture, is surely conclusive proof that here the symptoms cannot be explained on the basis of a mixed infection.* Even sapremia could be excluded in these cases, as in both an intra-uterine examination revealed the absence of all placental remnants or old bloodclots.

The course of gonorrheal puerperal fever, as compared with infection by other bacteria, is, as has been indicated, a very mild one. The fever usually lasts but a few days. The patient soon regains strength and appetite and as a rule hardly considers herself ill. The process is by no means, however, so quickly eradicated. It usually enters upon a sub-acute or chronic state in which the patient, besides suffering from a copious purulent discharge, has occasional attacks of severe pain and may suffer from persistent uterine hemorrhages. This often incapacitates them from work and where a collection of pus has formed in the tube or ovary, may require operative interference. A point that Fehling lays stress on, is that puerperal gonorrheal salpingitis is usually one-sided. He considers this of diagnostic importance and to those accustomed to regard one-sided puerperal adnex-tumors as streptococcic

in origin, rather subversive of former ideas. A parametritis is rarely seen, although Wertheim has demonstrated that gonococci can cause such an infection of the pelvic cellular tissue. Localized pelvic peritonitis is frequent on the other hand, and Olshausen has recently reported a reliable case of fatal general peritonitis following the rupture of a gonorrheal pus-sac. Such cases, however, must always arouse strong suspicion of a mixed infection.

More remote sequelæ are also recorded. Dabney and Harris of Johns Hopkins, report a case of fatal endocarditis in which gonococci were found on the valves. Similarly Hallé speaks of a patient with gonorrheal septicemia in which the endocardium was attacked. Arthritis is another not infrequent complication. The knee-joint is here the favorite site, though polyarthritis is also occasionally seen. For the child there is the increased danger of ophthalmia. A careless mother or nurse may readily cause such an infection *post partum*. The fact that none of the five children in our cases developed any eye trouble, may be partly ascribed to the comparative freedom of the genital tract from gonococci previous to and during delivery; partly to the prophylactic use of the 2-per-cent. silver nitrate solution, according to Credé.

In diagnosis the differentiation will be from streptococcic infection on the one hand and from sapremia on the other. From the former, gonorrheal puerperal fever is distinguished by its somewhat later onset (seventh to eighth day instead of fourth to fifth day), by the moderate degree of fever (103° in contrast to 105°), by the absence of signs of severe intoxication and by the regular and proportionately slow pulse. After 24 to 48 hours all doubt in the diagnosis is usually removed by the gradual remission of the fever. In sapremia we usually have a history of retained placental tissue, a foul-smelling discharge often attended by considerable bleeding, or at times a sudden blocking up of the lochia, and a large, soft, and rather insensitive uterus. In contrast thereto, we have in gonorrheal cases, a free yellowish, glairy discharge and a small, rather firm, but exquisitely tender uterus. In typical cases, therefore, the clinical diagnosis of gonorrheal puerperal fever is not so difficult. In atypical ones we must rest our diagnosis upon the microscopic examination of the lochia. *Frequent careful examination of the lochial discharge is, therefore, an absolute necessity in the diagnosis of every case of fever in the puerperium.*

The most essential feature in the treatment of these cases, as in that of other gonorrheal affections, lies in prophylaxis. And this prophylaxis should begin at a very early date. Every pregnant woman should be examined with a view to detecting a latent gonorrhea. Here the his-

tory of the case is usually of minor importance. Increased vaginal discharge, frequent, even burning urination, are so often found accompanying normal pregnancy, that only where these symptoms are very marked, do they possess any value. The objective findings are the essential ones. Pressure should always be made upwards against the urethra, in the digital examination, and if any secretion be present, no matter how slight, it should be carefully examined for gonococci. If the meatus of the Bartholinian glands be reddened or condylomata acuminata present, it must always be strong presumptive evidence of a gonorrhea. In doubtful cases we are justified in examining the cervix and obtaining some of its secretion for microscopic investigation. If the result is positive, treatment should begin at once. Just how far this treatment can safely go is a matter of opinion. Many will prefer to confine themselves to the giving of luke-warm douches and alkaline diuretics. Others, like Calmann, are not afraid to venture upon more vigorous treatment—such as the application of ointments to the cervix. On one point all are agreed, however, *i.e.*, that condylomata should not be cauterized or cut during pregnancy, as this almost invariably arouses premature labor pains.

During labor, prophylaxis is of even greater importance. If there are evidences of a gonorrhea, all internal examinations are to be avoided, unless special indications arise. Should such an examination prove necessary, it would be well to precede it by an antiseptic vaginal douche. This douche should never be omitted, where operative interference has been deemed necessary. Naturally, one will only resort to such operative measures when absolutely compelled to, for every intra-uterine manipulation in these gonorrheal cases is fraught with considerable danger. Above all does this apply to the manual delivery of the placenta. Small bits of placenta or membranes should be allowed to come away of themselves. Wherever an intra-uterine manipulation has been made, it should be followed by weakly antiseptic intra-uterine irrigation.

In the puerperium our efforts must be directed to the careful examination of the lochial discharge. Should the number of gonococci be markedly increased, even if no symptoms of an ascending process have developed, we must order absolute rest in bed for from 14 to 16 days and frequent hot antiseptic vaginal douches. Of course, all prophylaxis may be of no avail but at any rate we can feel that we have done all in our power to prevent the inoculation of the gonococci upon new fields.

In the treatment of this condition we come upon the greatest variety of opinions. In our series a rather vigorous plan of procedure was

adopted. In all cases either an intra-uterine douche or curettement was undertaken. In spite of the apparent success of this method in Cases 3 and 4 I would be far from advocating it without reserve. To give an idea of the wide difference of opinion on this subject, I cite the following:

RUNGE ("Geburtshilfe," 4th edition, p. 547): "Absolute rest is of more service than active measures such as douches, which are liable to further the extension of the process upwards."

FEIILING ("Physiologie und Pathologie des Wochenbettes," p. 165): "As a rule, vaginal douches together with ergotin internally will produce a sufficient decline in the fever; if not, then an intra-uterine douche will give comparatively good results, since the gonococci certainly do not penetrate so deeply into the uterine wall as streptococci."

DAVIS ("American Text-Book of Obstetrics," p. 239): "During the puerperal period the occurrence of septic inflammation in and about the uterus should be treated promptly by intra-uterine antisepsis, or as soon as possible by abdominal incision. It is folly to treat the insidious ravages of gonorrhea in the connective tissue, the peritoneum and contents of the pelvis occurring after labor by any but prompt surgical measures. Exploratory abdominal incision is far more conservative in these cases than delay."

CALMANN ("Diagnose und Behandlung der Gonorrhœ beim Weibe," p. 46): Advises absolute rest, the application of cold to the abdomen and if necessary, opium in the acute stage of ascending gonorrheal puerperal infection. He warns against even vaginal douches until all fever or pain on pressure has disappeared. The patient is to stay in bed for from four to seven weeks.

As yet, insufficient data has been collected to allow the deduction of positive conclusions as to treatment. The general tendency seems, however, to be against the radical ideas of such men as Davis. This is in accord with results in other forms of acute gonorrhea. Absolute rest is of the greatest importance but it conflicts sometimes with the proper removal of the purulent secretions. In all of my cases a considerable quantity of pus collected within the uterine cavitv and distinct relief was experienced when that cavity was emptied. I cannot imagine that a single antiseptic intra-uterine douche, if care is taken that the return flow is not checked, involves more risk of a salpingitis, than if the secretion is allowed to stagnate in the uterine cavity. Hence, I would be in favor of giving such a douche in all cases in which vaginal douches alone have not effected relief of pain and fever. As far as the antiseptics used in the intra-uterine douches are concerned, bichlorid even in

1-6000 dilution, may give rise to fatal intoxication,—hence, lysol in ⅛ to ¼-per-cent. solution, or 50 per cent. alcohol, is, on the whole, preferable.

Curettement, on the other hand, involves too much risk of a general infection. By such a procedure, we open up the blood and lymph channels and gonococci may thus be carried to the joints, giving rise to a most troublesome arthritis, or what is worse, be implanted upon the endocardium and produce a fatal cardiac affection. Whenever a localized collection of pus can be made out in the pelvis, and this collection does not show a tendency to absorption, vaginal incision and drainage will have to be resorted to. Calmann's suggestion to keep the patient in bed, for four to seven weeks, is good, but difficult to carry out in practice, as the patient usually feels so well that she cannot see the necessity of it.

To summarize in brief the essential points regarding gonorrheal puerperal fever:

First.—The gonococcus is the etiological factor in about one-sixth of all cases of puerperal infection.

Second.—Although almost invariably secondary to a gonorrheal process elsewhere, this trouble involves an infection of the puerperal wounds, and hence must be classified under the head of puerperal fever.

Third.—The gonococcus may gain access to the uterine cavity without any internal examination being made. Many a case of so-called autogenous infection may be explained in this way.

Fourth.—More frequently the process is brought about by digital examinations and operative manipulations, particularly intra-uterine, in the delivery of the child and placenta.

Fifth.—The infection shows itself about the sixth or eighth day *post-partum,* by rigors, a temperature of 103° and severe abdominal pains. The fever is usually of short duration and the further course of the disease is mild, but liable to become chronic.

Sixth.—Cases in which the temperature begins to rise as early as the sixth day, and runs up to 103° and 104° are not necessarily caused by a mixed infection, as Bumm and others hold, but can very well be due, as proven in cases 3 and 4 of my series, to the gonococcus alone.

Seventh.—The diagnosis is based on the rather late onset—the slow regular pulse—the moderate and steady elevation of temperature—the profuse purulent, glairy discharge, and, above all, the presence of gonococci in the lochia.

Eighth.—Prophylaxis is of more benefit than treatment. All pregnant women, having gonorrhea, should be delivered as far as possible

without internal examination. Treatment should be limited to one or two intra-uterine douches, frequent vaginal irrigations and rest in bed for a prolonged period of time.

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