

THE TREATMENT OF GONOCOCCUS VULVOVAGINITIS,
WITH FURTHER OBSERVATIONS ON THE VALUE
OF THE COMPLEMENT FIXATION TEST IN
THE MANAGEMENT OF THIS DISEASE *

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The gonococcus, in the vulvovaginitis of little girls, infects not only the vulva, but the vaginal mucosa, the cervix, the external os, and not infrequently the urethra. Perrin¹ believes that the gonococcus always infects the cervical canal. He describes the technic which he has used in the examination of about a hundred cases, and says that after wiping the vaginal surface of the cervix free of mucus, one can obtain pus containing the organism from within the cervical canal.

Although some observers have not found the cervical canal involved, all agree that the infection extends well into the vagina. Applications to the vulva alone cannot be expected to cure, since they do not reach the places where the gonococci are. It is on this basic principle that the method of treatment used in the Women's Room of the Genito-Urinary Department of the Massachusetts General Hospital has been developed.

In the very acute stage of vulvovaginitis, local treatment must be introduced with great caution. The vulva, in severe cases, is edematous and perhaps ulcerated; under these conditions the introduction of any instrument or the application of any irritating solution is bound to do harm. For such a case, confinement to bed, regulation of the bowels, much water, a light diet and the frequent bathing of the external genitals with warm boric solution are the measures to be employed.

As the acute condition subsides, and at the outset in less severe cases, the following method has been used by us with considerable success. It can be carried out in the clinic at daily visits, or can be used by any mother of ordinary intelligence who will take the trouble.

TREATMENT OF VAGINITIS

The child is placed on her back on the table, her hips elevated by a douche-pan. The labia are separated and a female soft rubber catheter, size 12 or 14 French, well lubricated, is passed through the opening in

* From the Genito-Urinary Department of the Massachusetts General Hospital.

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1. Perrin: *Rev. méd. de la Suisse romande.*, Nov. 20, 1911.

the hymen as far as it will go. One is surprised at the depth of the vagina, as the catheter often passes in for an inch and a half.

A fountain syringe is hung about two feet above the patient. The tube should be tipped with the glass part of a medicine dropper, which fits securely into the funnel end of the catheter. The solution selected for this douche, which will be discussed shortly, is allowed to run. From one to two quarts, heated to about 110 in the reservoir, should be used. After this solution has run into the vagina and out again around the catheter, the catheter and glass tip are separated, and through the catheter, which has been held in place all this time, one or two drams of one of the silver salts is injected with a hand syringe. The catheter is then withdrawn, the child holds her thighs close together to prevent the escape of the silver preparation and lies in this position, hips elevated, for at least fifteen minutes. This treatment should be given twice a day, but even if used only once daily, is very effective in checking the discharge. If given by the mother, she is instructed to wash the catheter carefully after each treatment and put it away in a clean towel. She is shown how to insert the catheter, and even in the Out-Patient Department, every woman who has had the desire to try has succeeded in giving the douches without doing any damage.

The solutions used for the douche are sterile water, boric acid solution 2 per cent., sodium bicarbonate a teaspoonful to a quart, or potassium permanganate 1-8,000 or 1-6,000. The purpose of the douche is the removal of mucus preliminary to the application of silver, and the increase of circulation locally through heat. In the more acute stages the blandest solutions are the best, sodium bicarbonate being especially soothing. Later, potassium permanganate, with its slight astringent action, is good, and in the chronic stages, silver nitrate as strong as 1-1,000 may be used.

In choosing a silver salt, one should start with the least irritating preparation. Argyrol 10 per cent. is well borne in the more acute cases; later it can be increased to 20 per cent., or the somewhat more irritant protargol can be used (not stronger than 5 per cent.).

In very chronic or persistent cases it may be expedient to apply tincture of iodine to the cervix. Perrin,¹ in the article mentioned above, advises the use of

Protargol	8 grams
Distilled water	8 grams
Glycerin to.....	50 grams

An endoscope is passed into the vagina and through this a small swab moistened with this solution is applied to the cervical canal. The same solution is instilled into the urethra. Perrin claims to have

cured about a hundred cases by this method, and in no case did the treatment extend over three weeks.

At one time vaccines were thought to be of great value. We have not used them, nor do we believe that their employment in gonococcus infections of the mucous membrane, whether in the male or in the female, has up to the present given sufficiently satisfactory results to warrant any dependence on them.

URETHRITIS

Urethritis occurs less frequently than in adults. Pollack found this condition in 18 per cent. of 187 cases; Scheuer in fifteen out of thirty-nine patients (both quoted by Norris, "Gonorrhea in Women," page 380).

We have treated this condition by the instillation of 1 or 2 c.c. of 5 per cent. argyrol into the urethra by means of a medicine dropper.

Proctitis we have never noted, nor have we seen any definite cases of extension of the infection above the cervix. These complications do occur and must be borne in mind.

DURATION OF TREATMENT

The treatment should be carried on for at least a month after all symptoms have disappeared. One must remember, however, that occasionally a discharge may be kept up by too persistent treatment. After treatment is stopped the case should be seen twice the first week, then once a week for three weeks, and even after that should be followed for several months. Smears should be taken from the depths of the vagina by inserting a small wire swab. When the disease is cured the smear should consist of mucus and epithelial cells, with practically no pus cells, and of course the diplococcus of Niesser should not appear.

Should children with gonococcus vulvovaginitis be allowed to attend school? We have believed that if their condition were made known to the teacher, it could be so arranged that they might not have to use the common toilet. This danger removed, they are less likely to be a focus of infection while in school than when playing untended on the street.

THE QUESTION OF CURE

In a previous paper² on "The Complement Fixation Test in the Management of Gonococcus Vulvovaginitis," we stated the evidence for our belief that this disease is curable. The contrary opinion is held by not a few, who maintain that although the infection may have periods of quiescence it is more than likely to reappear sooner or later. Edith

2. Smith, G. G.: *AM. JOUR. DIS. CHILD.*, 1913, v, 313.

Spaulding,³ in her very comprehensive paper on this subject, states that "the disease may extend over many years, during which time there may be many recurrences, and that the periods of latency may at least be as long as eighteen months." She also says that "the most efficient treatment does not insure a permanent cure." With such pessimistic conclusions we cannot agree. We cannot believe that the characteristics or clinical manifestations of the gonococcus in the vagina differ very greatly from its characteristics or clinical manifestations in the male urethra, and certainly in the latter situation the disease is curable. Wherever glands or crypts occur, as they do both in the cervical canal and in the male urethra, the infection will pursue an irregular course, at times almost disappearing, and again breaking out in profuse discharge; in deciding on the question of cure, therefore, this peculiarity of the gonococcus must be considered, and no case considered well until considerable time has passed during which there is no evidence of infection. This period in vulvovaginitis we would arbitrarily set at three months, although we believe the patient should be seen at intervals after that.

If after three or more months, during which frequent smears from the depths of the vagina have contained no pus and all other signs of infection have disappeared, a discharge containing gonococci recurs, we believe that this attack is frequently a reinfection, very possibly from the same source as the first. It is worth while to consider the likelihood of such a reinfection, and to investigate the home conditions surrounding the patient. The Children's Department at the Massachusetts General Hospital maintains a social worker who has been of great assistance in this way.

With this view as to reinfection Spaulding disagrees. She argues that of the twenty-six cases in her series, twenty-two had second attacks; and that some children who were infected in hospitals had recurrences after going home, whereas their sisters were not infected. The answer to these arguments is that in the majority of her cases the test of cure was insufficient. Thus in ten of the twenty-two recurrences, two months or less was the greatest interval between attacks. In one of the two cases in which vulvovaginitis recurred after two years of apparent health, Spaulding admits the possibility of a reinfection from other members of the family who were found to have gonorrhea.

Another explanation of attacks of vulvovaginitis following the original infection after a considerable period of health is that they are not due to the gonococcus at all, but to the other organisms which find that several weeks or months of suppuration have made the mucosa of the vagina a favorable ground for development. It is well known that

3. Spaulding: *AM. JOUR. DIS. CHILD.*, 1913, v, 248.

non-specific posterior urethritis occurs with vastly more frequency in men who have had a gonococcus infection at some preceding time, and it is our belief that for similar reasons non-specific vulvovaginitis is likely to occur in girls who have been infected by the gonococcus. The discharge in such cases looks like chalk and water, resembling in appearance the leukorrheal discharge of women. Under the microscope it shows epithelial cells in abundance and comparatively few pus cells. In two or three of our cases a very large Gram-positive bacillus was present. Silver nitrate douches in strength ranging from 1-5,000 to 1-1,000 have given the best results with this non-specific vaginitis.

Another type of vulvovaginitis not due to the gonococcus is characterized by irritation of the skin about the genitals and on the inner surface of the thighs; the discharge is scanty in amount, watery in consistency, and appears too slight for the extent of the dermatitis. Smears from the vagina show no pus, and it is our suspicion that the irritation is due to frequent masturbation.

As further evidence on the question whether gonococcus vulvovaginitis can be cured with any regularity, and also on the value of the complement fixation test in this connection, we wish to present the histories carried down to date of sixteen of the twenty-five cases reported in our earlier paper. The other nine we have been unable to find. In all these cases but one smears were taken from the depths of the vagina, stained by Gram's method and examined by us. The presence or absence of discharge was noted, in most cases a history was obtained, and in all the blood was submitted to Dr. James Homer Wright, pathologist at the Massachusetts General Hospital, for the complement fixation test.

The first ten cases are those which had negative bloods at the time the last paper was written (on or before Dec. 7, 1912). The duration of treatment of these cases in our clinic varied from a few weeks to two years. In some of them (Case 18 especially) the treatment was merely instituted by us and carried out entirely by the mother at home. Most of the cases came for treatment once or twice a week, and between visits were treated at home.

CASE REPORTS

CASE 1.—O. P. D., 177,098, M. McC. Infected August, 1911. Nov. 7, 1912. Some redness and smegma about genitalia. Smear: no gonococci. Blood negative. Nov. 1, 1913. Mother has seen no discharge since last visit. Dermatitis of labia majora and adjacent skin. No discharge; no redness of introitus. Smear: epithelium; rare leukocyte; a few Gram-positive cocci; no gonococci seen. Blood weakly positive.

CASE 2.—O. P. D., 119,061, G. G. Infected May, 1911. Feb. 3, 1912. No discharge. Smear negative. Blood negative. Nov. 1, 1913. Genitalia appear normal. No discharge. Has a suppurating gland in neck. Smear from vagina:

small number of pus cells, one of which contains Gram-negative cocci, not morphologically gonococci. Blood weakly positive.

CASE 3.—O. P. D., 186,609, H. C. Raped November, 1911. January, 1912. Gonococci present. March 11, 1912. Blood weakly positive. June 10, 1912. Blood negative. Nov. 22, 1912. No discharge noted by mother for over six months, except for three days in July, 1912; stopped when she gave the child a few douches. Smear: no pus; no gonococci. Blood negative. Dec. 5, 1913. Has had no discharge for seventeen months. Genitalia appear normal. Smear: epithelial cells, mucus, a few leukocytes. No gonococci seen. Blood weakly positive.

CASE 4.—O. P. D., 191,815, A. O. Raped November, 1911. Treated at Long Island Hospital (in-patient) from then until April 2, 1912. April 10, 1912. No discharge. Smear negative. Blood negative. Sept. 4, 1913. Has had no discharge for at least seventeen months. Genitalia normal. Not enough discharge for a smear. Blood weakly positive.

CASE 5.—O. P. D., 139,370, E. C. Infected in 1906. Gonococci present in 1910. April, 1912, blood positive. Nov. 23, 1912. Blood suspicious. Dec. 7, 1912. Blood negative. Smear: no pus, no gonococci. Sept. 4, 1913. No discharge for at least ten months, she says. Examination shows some leukorrhea of whitish color. Introitus slightly reddened. Smear: epithelium, no pus cells. A very large Gram-positive bacillus in large quantities. No gonococci seen. Blood weakly positive.

CASE 6.—O. P. D., 51,067, A. R. Infected June, 1911. Nov. 14, 1912. Mother has seen no discharge for a year. Blood weakly positive. Dec. 7, 1912. Blood negative. Smear: no pus, no gonococci. Oct. 30, 1913. No discharge for two years. No redness of genitalia. Smear: epithelium and mucus, no pus. Many Gram-negative bacilli. No gonococci. Blood negative. Dec. 6, 1913. Returns with complaint of brief sharp pains in lower abdomen. Very slight tenderness on deep suprapubic pressure. Rectal examination shows nothing abnormal. Considerable leukorrhea. Smear: epithelium, some pus. Large Gram-positive bacillus in great abundance. No gonococci seen.

CASE 7.—O. P. D., 159,570, L. S. Infected 1907. June 15, 1912. Labia red, no discharge. Blood negative. Nov. 22, 1913. Has had some discharge on clothes occasionally; some during past week. "Is much better than she was once." Two months ago had watery red discharge (mother's statement). Labia very red and irritated. Thin watery discharge. Smear: epithelium, a few pus cells. Gram-negative diplococci, larger than gonococci and not intracellular. Blood suspicious.

CASE 8.—O. P. D., 160,329, L. S. Sister of Case 7. Infected in 1910. June 11, 1912. Mother sees discharge at times. Blood negative. Nov. 22, 1913. No discharge for over a year. Genitalia normal. Smear: epithelium, no pus, no gonococci. Blood negative.

CASE 9.—O. P. D., 163,160, B. M. Infected October, 1910. Dec. 2, 1912. No discharge for eighteen months. Nov. 22, 1913. Some whitish discharge at times (mother's statement). None seen at examination. No redness. Smear: epithelium and mucus; no pus, no gonococci seen. Blood negative.

CASE 10.—O. P. D., 183,401, B. E. Infected November, 1911. March 9, 1912. No discharge. Blood negative. Dec. 13, 1912. No discharge now or since last visit. Smear: rare pus cell, no gonococci. Not seen since.

CASE 11.—Last test Nov. 23, 1912, weakly positive. Not seen since.

CASE 12.—Last test Nov. 21, 1912, suspicious. Not seen since.

CASE 13.—O. P. D., 197,035, I. K. Infected June, 1910. Oct. 19, 1912. Blood weakly positive. Nov. 23, 1912. Slight redness of vestibule. No discharge. Smear: no pus, no gonococci. Blood weakly positive. Feb. 15, 1913. Blood negative. Oct. 25, 1913. Has had no discharge for a year. No discharge. No

redness. Smear: epithelium, no pus, no gonococci. Very few bacteria in smear. Blood weakly positive.

CASE 14.—Last test May, 1912, positive. Not seen since.

CASE 15.—O. P. D., 177,097, G. McC. Sister to Case 1. Aug. 28, 1911. Gonococci present in smears. Nov. 14, 1912. Occasional discharge (mother's statement). No gonococci in smear. Nov. 1, 1913. Dermatitis of external genitalia. No discharge or redness of introitus. Smear: epithelium, rare pus cell, a few Gram-positive cocci. No gonococci. Blood weakly positive.

CASE 16.—Last test Nov. 18, 1912, positive. Not seen since.

CASE 17.—O. P. D., 141,770, I. C. Sister to Case 5. Infected January, 1910. May, 1912. Blood negative. Oct. 19, 1912. Discharge, which has been absent for six months, began again. Blood weakly positive. Sept. 4, 1913. Has discharge at times (sister's statement). Examination: genitalia normal. Smear: some mucus and epithelium. No pus. No gonococci seen. Blood weakly positive. Nov. 18, 1913. Blood negative.

CASE 18.—O. P. D., 143,269, K. C. Infected September, 1912. Nov. 23, 1912. Smear: no gonococci. Blood strongly positive. Nov. 1, 1913. Has had no signs of discharge for over a year (mother's statement). Genitalia normal. No discharge. Smear: epithelium, mucus; no pus, no gonococci. Blood moderately positive.

CASE 19.—O. P. D., 196,190, S. J. Infected June, 1912. Dec. 7, 1912. Some discharge. Smear: gonococci present. Blood suspicious. July 22, 1913. Blood negative. Oct. 25, 1913. No discharge for nine months. Genitalia normal. Smear: epithelium; no pus, many bacteria but no gonococci seen. Blood negative.

CASE 20.—Last test December, 1912, positive. Not seen since.

CASE 21.—Last test Nov. 23, 1911, weakly positive; not seen since.

CASE 22.—O. P. D., 196,813, B. A. Infected May, 1912. Dec. 7, 1912. Some discharge. Gonococci present in smear. Blood weakly positive. March 15, 1913. Blood weakly positive. Oct. 25, 1913. Blood negative. Has had douche to-day. Nov. 1, 1912. Some discharge. Smear: much pus, many diplococci, chiefly Gram-positive. A few atypical Gram-negative diplococci. These declared not to have the morphology of the gonococcus by Dr. J. H. Wright.

CASE 24.—O. P. D., 149,629, S. G. Sister to Case 2. Infected January, 1911. December, 1911. Gonococci present in smear. February, 1912. No discharge. Blood positive. Nov. 1, 1913. Slight amount of thin white discharge. Smear: epithelium, mucus, no pus. Many Gram-positive cocci. No gonococci seen. Blood moderately positive.

CASE 25.—Last test May, 1912, weakly positive. Not seen since.

DISCUSSION

Of the ten cases which had negative bloods and apparent cures one year ago, nine returned this year for examination. Of these only three now have negative blood tests; six are weakly positive or suspicious. Of these six, five give every sign of cure from the clinical point of view. All five had negative blood tests one year ago and not one has had any discharge since; yet the blood test now is weakly positive!

The finding of a weakly positive test in these cases which gave a negative test last year and have shown no signs of infection since, appears to be due to the greater sensitiveness of the test which has developed with further use. The belief is held by Dr. Wright and other workers that a slight inhibition of hemolysis (as seen in weakly positive tests) may be due to a so-called "group reaction"—that is,

gonococcus antigen will combine to a slight degree with the antibodies due to allied micrococci. Irons,⁴ states that occasionally in adults, and more frequently in children, a fairly positive reaction occurs in persons who have never had gonorrhea.

We have had under observation a girl of 18 who has been clinically cured of gonorrhea for over two years. She lately married and has borne a child, without the slightest sign of infectiousness or even discharge. Her blood is persistently weakly positive.

It is our belief, therefore, that in the determination of a cure a weakly positive test cannot be considered evidence that infection is still present. A negative test, on the other hand, appears to be proof of its absence.

Of the seven cases which had weakly positive blood tests a year ago, five are now clinically well. Of these, two have negative bloods, one a moderately positive and two weakly positive. The other two show some vaginitis in which, however, gonococci could not be found.

From the facts as shown in these sixteen cases, can we say that gonococcus vulvovaginitis is a curable disease?

It seems to us that in 50 per cent. of these cases (Nos. 1, 3, 4, 8, 9, 13, 17, 19) the evidence of cure would satisfy the most skeptical. Of the remaining 50 per cent. (Nos. 2, 5, 6, 7, 15, 18, 22, 24) no one seems to be still definitely gonorrheal. Case 2 is not cited as a cure because the patient has no definite history of freedom from discharge. Case 5 has a leukorrhea, which contains a large bacillus in almost pure culture. Case 6 would have been given a clean record on Oct. 30, 1913, but the leukorrhea which has started up since then spoils her record, although it does not appear to be due to the gonococcus. Cases 7, 15 and 22 may well be due to the gonococcus, although that organism was not found. Cases 18 and 24 we rule out because of a moderately positive blood test, although in every other respect Case 18 appears to be a cure.

The study of these cases, few though they are, warrants, we believe, a fairly optimistic feeling as regards the prognosis in this disease. Long and persistent treatment, frequent and severe tests of its probable cure, are necessary to complete success. We believe that in the great majority of cases of vulvovaginitis efficient treatment will insure the destruction of the gonococcus; a small proportion of such cases, however, will be liable to attacks of non-gonococcal inflammation for some time.

We wish to acknowledge our indebtedness to Dr. James Homer Wright, under whose direction the complement fixation tests were done, and to Miss Clara M. Welsh, social worker of the Children's Department of the Massachusetts General Hospital, through whose efforts the children mentioned in this paper were brought back to the clinic for examination.

4. Irons: Jour. Infect. Dis., July, 1912, p. 77.