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VULVOVAGINITIS IN CHILDREN : AN ACCOUNT OF ITS ETIOLOGY, SYMPTOMATOLOGY AND MANAGEMENT, WITH A SUMMARY OF SIXTY-THREE CASES OCCURRING IN SOUTH AFRICA

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(Continued)

PROPHYLAXIS

This aspect of the problem must appeal to the health administrator rather than to the clinician. In the handling of the individual case, however, the clinician, by his instructions and advice, must play a part. Exhortations that vulvovaginitis in children be made a notifiable disease have been uttered by Taussig and David Watson. Until this step is taken by responsible authorities, much of the effort of prevention will remain mis-spent.

Already precautions are being taken by the administrations of children's institutions. Such precautions include the following :

- (a) Examination of vaginal smears of all female children before admission. If these contain gonococci, admission is refused.
- (b) Rigid isolation of cases diagnosed after admission. This, of course, includes separate lavatories, utensils, clothing, toilet apparatus, and so on.
- (c) The detailing of special nurses for infected cases.

The control of isolated cases in their homes presents a much wider and more difficult problem. The source of infection is difficult and often impossible to find, and preventive measures equally baffling. Taussig has blamed the lavatory seat, and his recommendations for preven-

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tion take due note of this fact. Summarised they are as follows :—²²

- (a) The instillation of a drop of 2 per cent. silver nitrate solution into the vestibulum vaginæ of all new-born girls whose mothers show evidence of gonorrhœa.
- (b) Making vulvovaginitis in children a disease notifiable to the responsible health authority.
- (c) Instruction of parents of infected children through the health visitor regarding preventive methods to limit the infection. Such measures would include the use of separate towels and wash-cloths, sleeping in a separate bed, care as to a thorough cleansing of any contaminated clothing, and insistence on the infected child refraining from using the common lavatory.
- (d) Investigation by the health visitor as to the probable origin of the infection in each case with the view to excluding this factor from contaminating other children in the same house.
- (e) The adoption of the U-shaped seat with low bowl and other precautionary measures to prevent the spread of infection through the public lavatories in schools, playgrounds and tenements.

In elaboration of these last recommendations Taussig ²² says : “ I consider this last-named suggestion the most important of all, and there is no valid reason why it could not to a large measure be put into operation at once. Paper coverings for lavatory seats have been used for purposes of cleanliness in some of the large hotels, and their employment in public places, such as schools, playgrounds, etc., would probably diminish the chance of infection. As, however, children could not be relied upon to apply such papers properly, it would be safer to use the U-shaped seat in addition. The height of the bowl should not be over eight inches where the lavatory is to be used by children of school age. The presence of an attendant in the school lavatories, especially during recess, would aid materially in the discovery of girls having a discharge, in the proper use of the paper covers, and in the general cleanliness of the lavatory.”

To the parents of young female children in countries such as South Africa, where the coloured man is in many

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ways a menace to public health, we would offer the following advice :—

- (a) Look after the household lavatory with a care more scrupulous and exacting than that devoted to the drawing-room furniture. From the point of view of cleanliness, consider the lavatory the most important apartment in the house.
- (b) Wherever practicable, insist on having a separate lavatory for coloured servants.
- (c) See that your servants are healthy.
- (d) Do not allow casual coloured workmen to use the household lavatory. When workmen are in the house, take it for granted that they *have* used the lavatory, and take precautions accordingly.
- (e) Do not allow native or coloured charwomen to bring their babies to your house while they are performing their domestic duties—a custom ridiculously prevalent.
- (f) Do not allow native children to loiter on the step, whether they are returning the family laundry, hawking vegetables, or stacking firewood in the outhouse.

When handling an infected child in a well-to-do home, one should insist on the removal of all healthy female children under the age of puberty. If this precaution is neglected, the risk of their becoming contaminated is very grave, in spite of the most assiduous prophylactic efforts. Such female children may not return to their home until the patient has been gonococcus-free for at least three months.

It is wise in every case to put the patient under the care of a specially trained nurse, on no account leaving details of treatment to the mother. The infected child must not be allowed to attend school, and should be restrained from mingling and playing with other children. She should be fitted with closed knickers in the daytime, and a closed sleeping suit at night. All dressings should be burnt immediately on removal.

TREATMENT

Since Suchard, Atkinson and Pott recognised the infective nature of this disease treatment has been unsatisfactory and often disappointing. The dislodge-

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ment of an established gonococcus is never an easy matter, and the age and disposition of young children tend to increase the difficulties of both physician and nurse. Moreover, the immature female is so liable to re-infection that it is supremely futile to treat an infant while other members of the family remain infected. One cannot emphasise too strongly the importance of treating all other cases of gonorrhœa in the household. This sometimes is by no means a simple undertaking, but it is one which, with tact and discretion, is possible of accomplishment. In this connection it is interesting to note that Trenwith⁸⁵ offers the opinion that the majority of his cases of vulvovaginitis could be traced eventually to gonorrhœa in the father.

Literature shows little unanimity in the lines of treatment suggested, and merely emphasises the unsatisfactory nature of the majority of the therapeutic measures employed. These have varied from local applications of ointments, douches, applications *viâ* the urethroscope or vaginoscope tube, to prolonged hot baths, vaccine therapy and chemotherapy.

Maggiore washes the vagina with potassium permanganate solution, 1 in 20,000, and then swabs the whole surface dry. Tannic acid is dusted thickly over, and a pad placed between the labia and kept in position with a bandage. Dusting is renewed after each act of urination and the pad changed.⁸⁶ Cure in his hands is attained in an average of from one to three weeks.

Lode⁸⁷ used thermal baths without benefit, and warned against their employment. His results were similar to those of Risseoloda, Schulz⁸⁸ and others, but Engwer, Ylppo and Bendix each reported satisfactory results. Wagner⁸⁹ advocates copious irrigation with sterile water at high temperatures (45° C.), but children tolerate such measures badly.

Gellhorn⁹⁰ applies an ointment consisting of 1 per cent. silver nitrate in equal parts of white petroleum and lanoline. Stein⁹⁰ substituted mercurochrome for silver nitrate, and followed Gellhorn's technique. A subsequent account of this method is published by Dorne and Stein.⁹¹ Simmins⁹² finds pessaries containing acriflavine 1 in 500 efficient, but regards them merely as adjuvants to douching with silver solutions or chloramine-T. Wacho and Mazer⁹³ prefer the instillation of Dakin's oil, 1 per cent., carried

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out by means of a medicine dropper with the child in an elevated position.

Hamilton ⁶⁴ in his series of 344 cases tried several lines of treatment, all of which consisted of irrigations, instillations and vaccines. The irrigations employed were :—

Potassium permanganate, 1 in 4,000.
 Condyl's fluid, 3i to the pint.
 Physiological salt solution.
 Boric acid solution, 3 per cent.
 Formalin solution, 1 in 1,000.

In conjunction with these the following instillations were tried :—

Silver nitrate, 1 to 5 per cent.
 Protargol, 1 to 10 per cent.
 Argyrol, 20 to 50 per cent.
 Ichthargan, 0.5 to 5 per cent.
 Collargol, 1 to 5 per cent.
 Ichthyol, 1 to 10 per cent.
 Emulsion of *Bacillus bulgaricus*, 10 to 50 per cent.

Vaccines were employed in conjunction with these local applications. This worker concludes that vaccine therapy has a very definite place in the treatment of this infection.

Lees ²¹ advocates hot hip baths once or twice daily, after which the parts are carefully swabbed over or painted with 0.5 per cent. aqueous solution of picric acid or with half strength colloidal silver. Applications to the cervix are made through a urethroscope tube, and excellent therapeutic results are obtained from the administration of vaccines.

Churchill and Soper ³³ believe that vaccines shorten the duration of the disease, as a result of their experience in treating 41 cases, in which they made opsonic index controls. Many other workers have reported favourably on the employment of vaccines in this condition, including Daken,⁹⁴ Butler and Long,⁹⁵ Eyre and Stewart,⁹⁶ Hamilton and Cooke,⁹⁷ Whitehouse,⁹⁸ Schmitt,⁹⁹ Morrow and Bridgman,¹⁸ Fitzgibbon,¹⁰⁰ Frassi,¹⁰¹ Reith Fraser,⁶⁹ and many others. On the other hand, vaccines have been discarded as useless, disappointing, or uncertain by such workers as Bruck,¹⁰² Bruck and Sommer,¹⁰³ Sauvage,¹⁰⁴

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Hamburger,¹⁰⁵ Jack,¹⁰⁶ Smith,¹⁰⁷ Sullivan and Spaulding,¹⁰⁸ Taussig,²² Kidd,¹⁰⁹ and Watson.¹⁹

Harrison¹¹⁰ favours irrigation with chloramine-T, followed by direct swabbing with 25 per cent. mercurochrome once weekly. Applications of Lugol's iodine solution are advocated by Bland¹¹¹ and Barnett.⁶¹ Morrow and Bridgman¹⁸ employ 25 per cent. iodoform in glycerine. Patzschke¹¹² adds adrenalin hydrochloride solution 1 in 1,000, in a strength of 1 to 2 in 20 of a 0.5 per cent. solution of albargin, stating that this intensifies the action of the silver.

Kelly¹¹³ swabs the vagina through a speculum with silver nitrate solution varying from 3 to 30 per cent., and injects a 5 per cent. solution into the urethra.

Norris⁶² has emphasised the vital importance of continuous treatment long after clinical symptoms have disappeared. He applies the principles of free drainage, relying for the remainder on the power of desiccation to kill the gonococcus. If the hymen interferes with drainage it is sacrificed. With the child in an elevated position the vagina is irrigated with weak potassium permanganate solution. The surfaces are cleansed by swabbing with 25 per cent. argyrol solution. The whole cavity then is swabbed dry, and an empty atomizer completes the process. Drying is continued for half an hour, the child being kept in this position, with air circulating through the cavity. At the end of this time 1 or 2 per cent. solution of silver nitrate is applied, and the strength increased according to the tolerance of the mucosa. This procedure is repeated every second day, further treatment consisting of daily irrigation with potassium permanganate solution. Thoroughness and regularity of treatment are insisted upon. The criticisms of such a plan are these: (1) the coagulating effect of powerful silver solutions is incompatible with the principles of free drainage: (2) deeply-seated gonococci are induced to seek refuge by penetrating still deeper instead of being induced to come to the surface; (3) particularly in older children with precocious tendencies, too much handling of the genitalia is thrown upon the physician; (4) the procedure is a long and tedious one for the child; in very young children this is a real difficulty, and in older children it is exceedingly apt to lead to morbid curiosity and precocity.

Taussig²² wisely insists on the importance of general

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treatment, good food, fresh air and iron tonics. Rest in bed is insisted upon during the early stages, and urotropine is administered by the mouth. Local treatment consists of instillations of 25 per cent. argyrol solution. Vaccines are condemned, and he agrees with Watson¹⁹ that lactic acid tablets give disappointing results. As time goes on 1 per cent. silver nitrate solution is instilled into the vagina daily during the third and fourth weeks, 2 per cent. every other day during the fifth and sixth weeks, and 4 per cent. twice, and later once, weekly during the seventh to tenth weeks. A two months' holiday follows the disappearance of symptoms.

Kidd and Simpson⁵⁶ have obtained satisfactory results from the routine use of 2 per cent. acriflavine in salt solution. This is done by means of wool twisted on to Playfair's probes after the vulva has been dried with mops. Should the acriflavine prove too irritating—as, for example, when it is used daily—it is alternated with eucalyptus 10 per cent. in sterile olive oil, 10 per cent. collosol silver, or 10 per cent. anosol. The average time of cure in all cases was four months. The majority of cases cleared up in three to five weeks, but the figures were weighted with a number of resistant cases that took many months to cure.

Abraham³⁷ describes his technique: “(1) Douche the parts daily with warm sterile water in which sodium bicarbonate one drachm to the pint is dissolved. Continue until all visible discharge is removed, using pledgets or wool soaked in the solution if necessary. If the vagina is inflamed, the sodium bicarbonate solution should be introduced through a soft rubber catheter connected with the douche-can raised not more than a foot above the couch. (2) After douching is completed, smear a paste of Bulgarian sour milk mixed with half its bulk of castor sugar, all over the vulva, introducing, if necessary, a gauze tampon soaked in the same material into the vagina. This paste should be cleaned away, and re-applied daily. (3) Examine the vagina weekly with a Joly aero-urethroscope to see if any inflammatory spread is taking place. If this is found occurring, douche the vagina with 1 per cent. lactic acid, or 1 in 1,000 ‘Milton,’ daily, and swab out the fornices twice weekly by means of a wool-tipped probe soaked in 1 in 40 acriflavine. (4) A bi-weekly injection of vaccine is given.” He states that the case

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should be free from symptoms after the seventh week, and smears are taken weekly up to the tenth week. When relapses occur they are mainly due to insufficient attention to the urethra, vaginal vault or anus.

Elsewhere we ⁶⁹ have described a plan of management which included measures to protect other members of the household, general measures such as fresh air and extra feeding, the duties of the nurse and those of the physician, and a schedule of vaccine dosage.

Local treatment should be carried out as far as possible by a special nurse in charge, so that the opportunities of sexual introspection and morbid curiosity on the part of the child are reduced to a minimum. Such local measures include hot rectal irrigation morning and evening; hot sitz baths three or four times daily; and mild vaginal irrigation once a day. The vaginal douche may be chloramine-T, Dakin's fluid, "Milton," 3i to a pint, or potassium permanganate solution, 1 in 16,000. Where it is impossible to employ a nurse, the rectal douche may be carried out by the mother, and is very much the most important local procedure in this part of the management. The vulva is dried with wool mops, dusted thickly with tannic acid, a pad placed in position, and the child fitted out in a closed knickerbocker suit. After each act of urination the pad is changed and the tannic acid re-applied.

In addition to these measures the physician should deal with the vagina twice weekly in the early stages, and once weekly later on as resolution advances. After douching, the vagina is swabbed dry with wool-mounted probes. It is then swabbed thickly with the following three solutions in rotation, one solution only being used at one sitting: "Milton" in glycerine, 50 per cent.; picric acid in glycerine, 1 per cent.; and tincture of iodine in glycerine, 10 per cent. After swabbing, the vaginal cavity is packed with gauze saturated in the same preparation and left in until the following morning, when it is removed by the nurse. As time goes on the picric acid and iodine preparations are discontinued, and "Milton" in glycerine alone is used. In the hands of the writer this preparation is superior to acriflavine and mercurochrome 220.

At regular intervals smears are made from vagina, urethra, vulva and rectum for examination. In this way treatment is controlled quite apart from the disappearance of clinical signs.

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After the gonococcus has disappeared there is frequently an opalescent exudate left which is mistaken for a discharge and often is difficult to remove. Microscopically it contains 100 per cent. epithelium and no pus. This is an absolute indication to cease all douching and endeavour as far as possible to restore the mucosa to its normal texture. This is best done by endeavouring to produce a culture of *Bacillus bulgaricus* or of yeast in the vagina. A paste is prepared of Bulgarian sour milk mixed with half its bulk of castor sugar. The whole vaginal surface is smeared thickly with this paste, and a tampon soaked in the semi-dilute paste is introduced into the vagina and left there for twenty-four hours. If repeated several times at intervals of not longer than two or three days a culture is readily obtained, and the mucinous exudate ceases. Similarly a piece of ordinary commercial yeast dipped in glucose and introduced into the vagina once daily for several days attains the same objective.

If the child is difficult to handle, it has been our practice to carry out local treatment under general anæsthesia secured by the administration of ethyl chloride. As a rule, any upset from which the child suffers is negligible. Gas and oxygen is suitable for older children.

The routine use of vaccines in the treatment of vulvovaginitis has already been justified by experience. Much depends, however, on the mode of their application. The method of increasing the dose at fixed intervals, depending for guidance on the length and severity of the negative phase, has led to much disappointment. One has found that the daily administration of infinitesimal doses gives very much more satisfactory results, and the negative phase has come to be regarded as an indication of error in dosage. The dose is neither increased nor diminished after successful estimation of the correct immunising dose. Vaccines are combined with weekly doses of trimine, or with sulfarsenol given intramuscularly. These drugs have been found of great value in enhancing the immunising response.

The table on p. 10 indicates the doses of vaccines, etc.

Should the reaction to the vaccine be a violent one, or the local effect painful, the dose may be administered on alternate days, without any variation in size, until the immunity curve has risen sufficiently to cause no reaction

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of consequence. General upset, fever and increase of pulse rate should never occur. The table given here indicates a rough average dosage, and is capable of considerable elasticity. Particularly is this so in the case of older children. From the ages of eight onwards, the doses stated may be more than doubled (except in the case of sulfarsenol) with no local or general upset, and much benefit. It is found that such a scheme of small daily doses gives a definitely better immunising response than the usual method of increasing the dose at fixed intervals. The immunising process is continuous and

Age of child.	Daily dose of stock vaccine in millions of gonococci.	Daily dose of detoxicated vaccine in millions of gonococci.	Weekly dose of trimine in c.c.'s.	Weekly dose of sulfarsenol in grammes.
Under 1	1.0	100	0.1	0.08
1	1.5	150	0.1	0.08
2	3.0	300	0.1	0.08
3	6.0	600	0.1	0.08
4	10.0	1,000	0.2	0.12
5	10.0	1,000	0.2	0.12
6	10.0	1,000	0.2	0.12
7	12.0	1,200	0.4	0.14
8	15.0	1,500	0.5	0.14
9	18.0	1,800	0.75	0.16
10	20.0	2,000	0.75	0.16
11	20.0	2,000	0.75	0.16
12	20.0	2,000	1.0	0.18
13	25.0	2,500	1.0	0.18
14	30.0	3,000	1.0	0.18

uninterrupted by any clinical negative phase. The occurrence of a negative phase at once indicates an error in dosage.

It is claimed that this scheme of treatment gives satisfactory results, that permanent cure can be guaranteed, and that complications do not occur. The child does not offer any objection to the daily administration of vaccines if a little tact, together with a small sharp needle, is employed. Such a scheme is planned so that there may be the smallest possible amount of handling of the genitalia by the physician compatible with efficiency. This is an exceedingly important point when dealing with older

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children who are aware of the approach of puberty and the fascinating mysteries of sex.

STANDARD OF CURE

The fact that relapse is characteristic of the disease makes apparent the importance of setting a high standard of cure. The objects of any standard of cure are complex, integral parts being :—¹¹⁴

- (1) To satisfy ourselves that the patient is cured.
- (2) To enable us to guarantee reasonably that she will not suffer any relapse.
- (3) To protect her from any future sequelæ.
- (4) To assure the parents that urogenitally the patient is non-infectious.
- (5) To satisfy ourselves that her lower urogenital system has returned to normal.
- (6) To inconvenience the patient as little as possible.
- (7) To keep the child under treatment as short a time as is consistent with a reasonable standard of cure.
- (8) To make the standard workable.

The writer agrees with Norris ⁶² that the complement fixation test is unreliable here as elsewhere, but Smith,⁴⁵ Bland,¹¹¹ and others, have found it of service. In direct contrast with our experience in the male and female adult, cultural methods are of considerable value in determining cure in vulvovaginitis. Gonococci can be cultivated frequently when smears are negative, and often are procured in pure culture. This possibly is due to the fact that they have not been crowded out in the vagina by other bacteria.

Norris believes that cases are cured when they show three consecutive negative smears at two-week intervals after cessation of treatment. The final examination is preceded by his provocative method of chemical irritation. Bland ¹¹¹ continues treatment until he has procured four consecutive negative smears, and until the complement fixation test is negative.

As already indicated, we do not employ the provocative method of chemical irritation. A moderately large dose of gonococcus vaccine is the only provocative procedure advocated. Smears are examined twenty-four hours after

SUMMARY OF CASES

No.	Age in Years.	Organisms in Vulva.	Gonococcus in Rectum.	Source of Contamination.	Duration of disease when brought under observation.	Complications.	Duration of Treatment.	Period of observation after cessation of treatment.	Termination.
1	11	Gonococcus	+	Father had gonorrhoea	3 months	Nil	6 months	6 months	Negative after 3 months and again after 6 months.
2	9	Gonococcus	+	Lavatory seat in railway train	14 months	Nil	4 months	6 months	Negative after 6 months.
3	2½	Gonococcus	+	Father had gonorrhoea 10 years previously	2 weeks	Nil	10 weeks	3 months	Negative after 3 months.
4	1½	Gonococcus	+	Unknown	2 days	Nil	14 weeks	3 months	Negative after 3 months.
5	3	Gonococcus	+	Native nursemaid had gonorrhoea.	3 months	Nil	21 weeks	6 months	Negative after 6 months and again after 12 months.
6	9	Gonococcus	+	Native unmarried nurse was pregnant	7 weeks	Nil	12 weeks	6 months	Negative after 6 months.
7	1½	Gonococcus	+	Elder sister had gonorrhoea	18 months	Nil	11 weeks	3 months	Negative after 3 months.
8	3½	Gonococcus	+	Sister of case No. 7	18 months	Nil	11 weeks	3 months	Negative after 3 months.
9	6	Gonococcus	+	Native nursemaid	3 weeks	Nil	10 weeks	Nil	Unknown.
10	6	Gonococcus	+	Unknown	4 days	Nil	10 weeks	Nil	Unknown.
11	4½	Gonococcus	+	Attempted rape by coloured house boy.	12 hours	Nil	12 weeks	1 year	Negative after 1 year.
12	3½	Gonococcus	+	Parents had gonorrhoea	7 days	Nil	10 weeks	Nil	No clinical relapse.
13	1½	Gonococcus	+	Native nursemaid	3 months	Nil	14 weeks	3 months	Negative after 3 months
14	5½	Gonococcus	+	Unknown	<i>Circa</i> 3 months	Peritonitis	20 weeks	Nil	Unknown.
15	11	Gonococcus	+	Coloured housemaid	2 weeks	Nil	8 weeks	9 months	Negative after 3 months and again after 6 months.
16	2½	Gonococcus	+	Father had gonorrhoeal history	3 days	Nil	5 weeks	1 month	Negative after 1 month. Family left Cape Town.
17	6	Gonococcus	+	Unknown	14 months	Nil	3 months	3 months	Negative after 3 months.
18	3½	Gonococcus	+	Sister of case 17	14 months	Nil	3 months	3 months	Negative after 3 months.
19	2	Gonococcus	+	Sister of cases 17, 18	12 months	Nil	3 months	3 months	Negative after 3 months.
20	2½	Gonococcus	+	Railway lavatory	3 days	Nil	3 weeks	Nil	Family doctor reported cure 6 months later.

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21	11½	Staphylococci Diphtheroids	+	Coloured housemaid	2 weeks	Nil	14 weeks	3 months	Negative after 3 months.
22	4	Gonococcus	+	Unknown	2 years	Nil	20 weeks	3 months	Negative after 3 months.
23	6½	Gonococcus	+	Unknown	5½ years	Nil	12 weeks	1 year	Negative after 3, 6, 9, and 12 months.
24	8½	Staphylococci Diphtheroids	-	Unknown	14 months	Nil	21 weeks	6 months	Negative after 3 and 6 months.
25	1½	Staphylococci <i>B. coli</i>	+	Native nurse girl	8 days	Nil	12 weeks	3 months	Negative after 3 months.
26	1½	Liphtheroids	+	Unknown	2 days	Nil	12 weeks	2 years	Negative after 3 months.
27	3½	Gonococcus	+	Father had gonorrhœa	3 months	Nil	14 weeks	3 months	Negative after 3 months.
28	2	Gonococcus	+	House boy had gonorrhœa	2 weeks	Nil	14 weeks	1 year	Negative after 3 months. Positive after 6 months. Negative after 9 and 12 months.
29	8½	Gonococcus	+	Coloured house boy	6 months	Nil	12 weeks	3 years	Negative after 6 months. Positive after 18 months. Negative after 3 years.
30	6½	Gonococcus	+	Unknown	2 weeks	Nil	10 weeks	Nil	Unknown.
31	3½	Gonococcus	+	Coloured nursemaid	12 hours	Nil	9 weeks	Nil	Family doctor reported negative after 6 months.
32	9	Gonococcus	+	Unknown	14 months	Nil	28 weeks, during which relapse occurred 4 times	6 months	Negative after 6 months.
33	7½	Gonococcus	+	Unknown	5 days	Nil	2 weeks	Nil	Unknown.
34	2½	Staphylococci Diphtheroids	+	Native house boy	6½ years	Nil	14 weeks	Nil	Still positive after 14 weeks. Family left Cape Town.
35	4	Gonococcus	+	Mother had gonorrhœa. Father's history doubtful	3 months	Nil	10 weeks	3 months	Negative after 3 months.
36	3½	Gonococcus	+	Unknown	2 days	Nil	10 weeks	3 months	Negative after 3 months.
37	2½	Gonococcus	+	Unknown	2 days	Nil	11 weeks	2 years	Negative after 6, 18, and 24 months.
38	9	Gonococcus	+	Father had extensive venereal history	9 weeks	Nil	9 weeks	1 year	Negative after 1 year.
39	4	Gonococcus	+	Unknown	3 weeks	Nil	10 weeks	1 year	Negative after 6 and 12 months.
40	2½	Gonococcus	+	Two coloured servants had gonorrhœa	12 hours	Nil	12 weeks	1 year	Negative after 3, 6, 9, and 12 months.

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SUMMARY OF CASES—continued

No.	Age in Years.	Organisms in Vulva.	Gonococcus in Rectum.	Source of Contamination.	Duration of disease when brought under observation.	Complications.	Duration of Treatment.	Period of observation after cessation of treatment.	Termination.
41	8½	Gonococcus	+	Unknown	4 months	Nil	14 weeks	3 months	Negative after 3 months.
42	7½	Staphylococci	+	Unknown	3 days	Nil	14 weeks	Nil	Unknown.
43	1½	Diphtheroids	+	Railway train lavatory	4 days	Nil	10 weeks	Nil	Family doctor reports negative after 3 months.
44	1½	Gonococcus	+	Unknown	2 weeks	Nil	12 weeks	Nil	Unknown.
45	6	Gonococcus	+	Unknown	7 days	Nil	11 weeks	Nil	Unknown.
46	5	Gonococcus	+	Unknown	2 days	Nil	10 weeks	Nil	Unknown.
47	3½	Gonococcus	+	Coloured nursemaid	7 weeks	Nil	10 weeks	6 months	Negative after 6 months.
48	3½	Gonococcus	+	Native nursemaid	3 days	Nil	15 weeks	3 months	Negative after 3 months.
49	3½	Gonococcus	+	Native nursemaid	2 weeks	Nil	8 weeks	3 months	Negative after 3 months.
50	6½	Staphylococci	+	Father's history doubtful	18 weeks	Nil	21 weeks	6 months	Still positive after 6 months.
51	2½	Diphtheroids	+	Unknown	7 weeks	Nil	10 weeks	3 months	Negative after 3 months.
52	4	Gonococcus	+	Unknown	3 weeks	Nil	14 weeks	Nil	Unknown.
53	5½	Staphylococci	-	Unknown	2½ years	Nil	21 weeks	6 months	Negative after 6 months.
54	4½	Diphtheroids	-	Coloured cook	5½ days	Nil	11 weeks	3 months	Negative after 3 months.
55	3½	Gonococcus	+	Unknown	8 days	Nil	13 weeks	3 months	Negative after 3 months.
56	3½	Staphylococci	+	Unknown	4½ months	Nil	27 weeks	Nil	Still positive at end of treatment.
57	3	Diphtheroids	+	Unknown	2 days	Nil	12 weeks	1 year	Negative after 3, 6, and 12 months.
58	6½	Gonococcus	+	Father's history suspicious	7 days	Nil	12 weeks	Nil	Unknown.
59	1½	Gonococcus	+	Elder sister had vulvovaginitis	25 weeks	Nil	14 weeks	3 months	Negative after 3 months.
60	7½	Staphylococci	-	Sister of case No. 59	2½ years	Nil	10 weeks	1 year	Negative after 3 months. Positive after 6 and 9 months.
61	9	Gonococcus	+	Unknown	3 months	Nil	15 weeks	3 months	Negative after 12 months.
62	12½	Gonococcus	+	Unknown	8 days	Nil	7 weeks	3 months	Negative after 3 months.
63	4½	Gonococcus	+	Coloured housemaid	2 months	Nil	12 weeks	18 months	Negative after 3, 12 and 18 months.

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its administration. Treatment is continued until three consecutive fortnightly negative smears are obtained. Whenever possible the child is then sent to the country for two months. On her return, culture slopes are inoculated from the cervix, vagina, urethra and vulva, and rectal smears made, after the administration of a provocative vaccine. If these prove negative, no further treatment is undertaken. This bacteriological examination is repeated in three months' time. If again negative, the child may be declared cured. In the case of older children, where such manipulation of the genitalia is likely to cause sexual introspection and speculation, it is advisable to carry out the examination with the aid of a general anæsthetic.

Such a standard may be criticised as being unreasonably severe. The fact that relapse is characteristic of the course of the disease, however, must be submitted in extenuation. Moreover, the danger to other female children of an unrecognised relapse cannot be disregarded. In view of these facts we can state dogmatically that such a standard is none too rigid.

From the series of cases herewith summarised the following points emerge :—

(1) The gonococcus was demonstrated in the vulva and vagina in 54 out of 63 cases. In five of the remaining cases the gonococcus was demonstrated in the rectum, while the remainder were chronic cases which had been under treatment of sorts for varying periods before they came under observation. When one has regard for the notorious difficulty of demonstrating the gonococcus in chronic conditions of long standing, one is entitled to suspect that the original causative organism in these cases was in all probability the gonococcus.

(2) The gonococcus was demonstrated in the rectum in 59 cases. With this evidence one is justified in describing rectal implication as a symptom rather than as a complication.

(3) On six occasions the gonococcus was demonstrated in the rectum when it was negative in vaginal smear and culture. In the vast majority of cases the rectal gonococcus was recovered by cultural methods.

(4) The gonococcus, therefore, was demonstrated 54 times in the vagina and 59 times in the rectum, in spite of the fact that symptoms were entirely vulvovaginal.

(5) The average duration of treatment was 12.9 weeks.

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This includes an average of four to five weeks when the patient was free from symptoms. It is one's experience that relapses occur when treatment ceases with the disappearance of symptoms. While such long duration of treatment may not appear convincing, one knows of no treatment method which will shorten it with any guarantee against relapse.

(6) Three cases relapsed at a subsequent date, while three did not appear to benefit bacteriologically from treatment. Of the remaining cases where observation was possible, no relapse was noted. Thus 42 cases showed no relapse after periods of observation varying from three to twenty-four months.

(7) The average period of observation after cessation of treatment was 5.4 months. In many of the other cases where no observation period was possible—17 in all—one is satisfied that any clinical relapse would have been brought to one's notice. This fact, therefore, tends to raise the percentage of cases which did not relapse after cessation of treatment. When we consider that relapse is characteristic of the disease, these results seem to justify the prolonged duration of active treatment.

(8) The average age of the patient in this series was 4.7 years.

(9) In only one case was there any upward spread of the infection. No other complication was noted. The incidence of complications in this very small series, therefore, was 1.58 per cent.

(10) Investigation of the origin of the disease proved unsatisfactory. In 27 cases no origin could be traced. In 11 cases there was some evidence of infection of the parents, while in 17 cases native or coloured servants were implicated. Three cases traced contamination to the lavatory seats of railway trains following long railway journeys. Only in one case was there attempted rape.

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It was originally intended to contribute a joint paper with Dr. A. G. B. Duncan. On account of the difficulties of communication, however, we were compelled reluctantly to abandon this project, and I have limited myself to reporting a series of South African cases. Nevertheless, I wish to express my indebtedness to Dr. Duncan for

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many suggestions and ideas regarding the difficult problem of managing this type of case during the years when we were associated in venereal work in Britain.

REFERENCES

- (85) TRENWITH. *New York Med. Jour.*, 1906, 240.
- (86) MAGGIORE. *Pediatrics*, Naples, May, 1919, 257.
- (87) LODE. *Deut. med. Woch.*, 1909, xlv., 714.
- (88) SCHULZ. *Arch. f. Kinderh.*, 1919, lxvii., 429.
- (89) WAGNER. *Berlin klin. Woch.*, December 25th, 1911.
- (90) GELLHORN. *Jour. Am. Med. Assn.*, 1920, lxxv., 1647.
- (91) DORNE and STEIN. *Illinois Med. Jour.*, 1924, xlv., 219.
- (92) SIMMINS. *Lancet*, 1922, ii., 744.
- (93) WACHO and MAZER. *New York Med. Jour.*, 1920, cxi., 1997.
- (94) DAKEN. *Münch. med. Woch.*, 1920, lxvii., 1172.
- (95) BUTLER and LONG. *Jour. Am. Med. Assn.*, 1908, i., 744.
- (96) EYRE and STEWART. *Lancet*, 1909, ii., 76.
- (97) HAMILTON and COOKE. *Jour. Inf. Dis.*, 1908, v., 158.
- (98) WHITEHOUSE. *Practitioner*, 1910, i., 499.
- (99) SCHMITT. *Münch. med. Woch.*, 1911, lviii., No. 51.
- (100) FITZGIBBON. *Brit. Med. Jour.*, 1913, i., 716.
- (101) FRASSI. *Rivista di clin. Pediat.*, 1921, xix., 290.
- (102) BRUCK. *Deut. med. Woch.*, 1909, xxxv., 470.
- (103) BRUK and SOMMER. *Münch. med. Woch.*, 1912, lx., 1185.
- (104) SAUVAGE. *Le Bull. med.*, 1913.
- (105) HAMBURGER. *Deut. med. Woch.*, 1914, xl., No. 15.
- (106) JACK. *Glasgow Med. Jour.*, 1913, ii., 84.
- (107) SMITH. *Am. Jour. Dis. Child.*, 1913, v., 313.
- (108) SULLIVAN and SPAULDING. *Jour. Am. Med. Assn.*, 1916, lxvi., 95.
- (109) KIDD. *Brit. Med. Jour.*, 1917, i., 3.
- (110) HARRISON. *St. Thomas's Hosp. Gaz.*, 1923, xxix., 310.
- (111) BLAND. *New York Med. Jour.*, March 20th, 1920.
- (112) PATZSCHKE. *Deut. med. Woch.*, 1921, xlvii., 44.
- (113) KELLY. "Medical Gynecology," 1908, 371.
- (114) REITH FRASER. *Jour. Urol.*, 1921, v., 439.